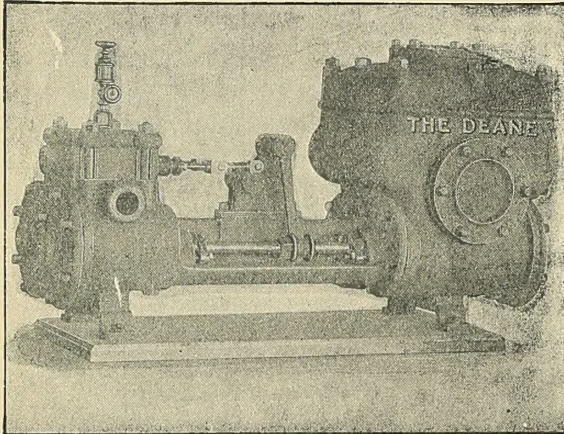


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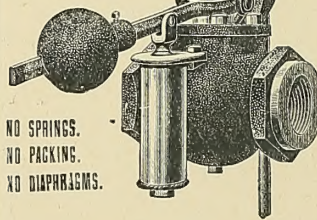
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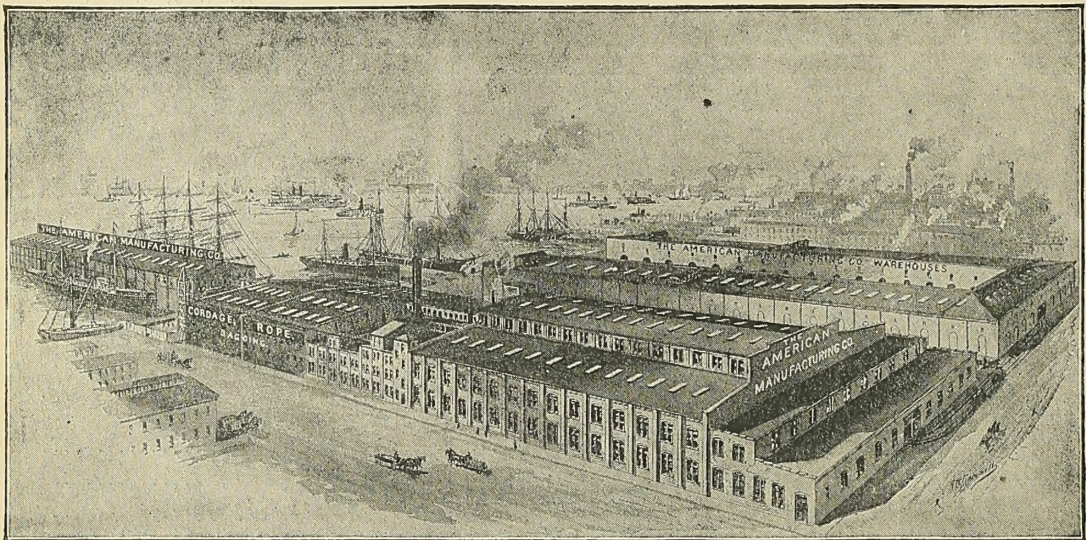
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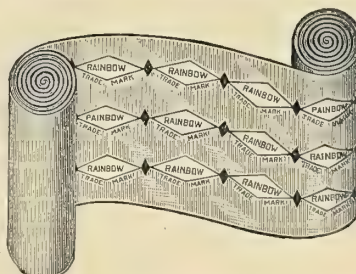
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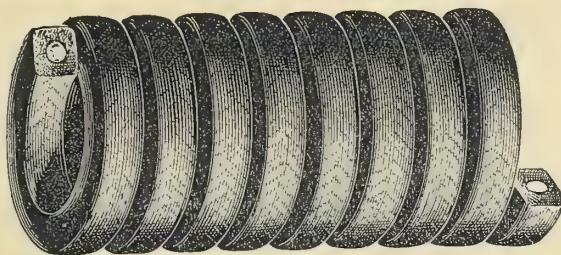
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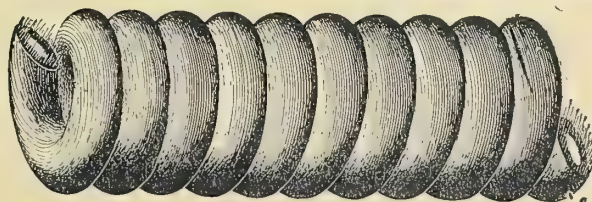
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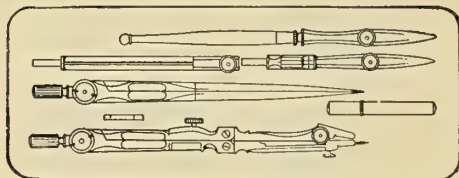
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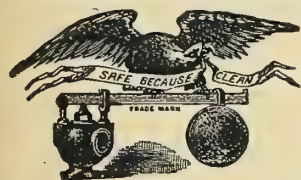
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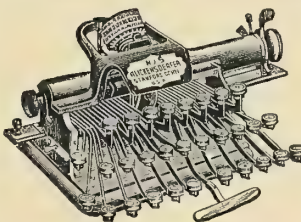
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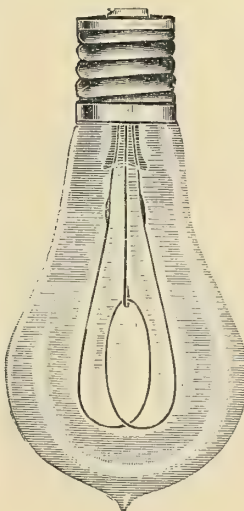
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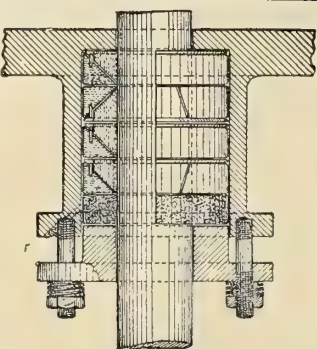
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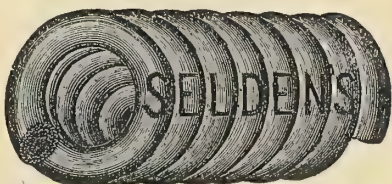


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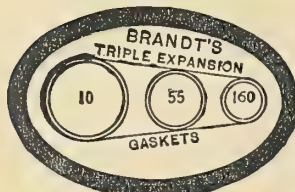
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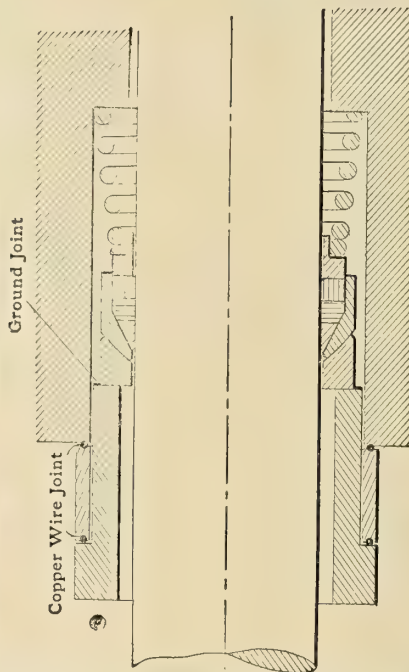
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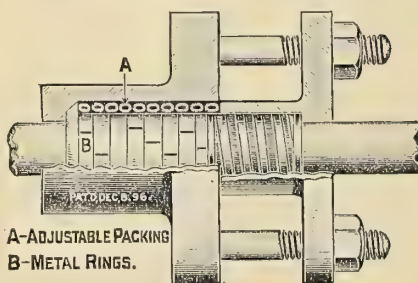
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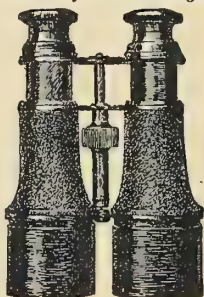
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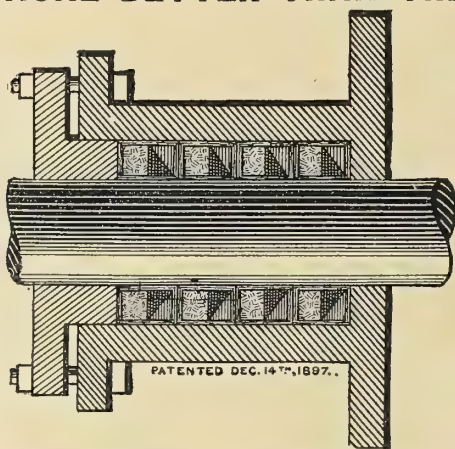
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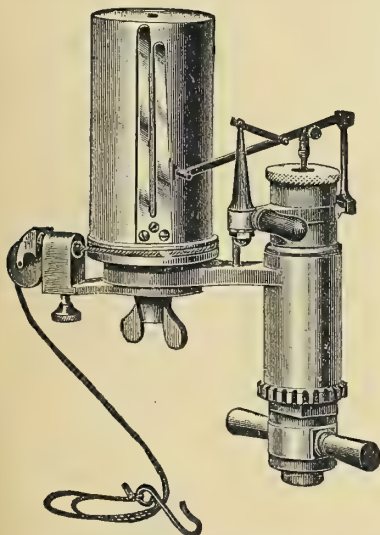
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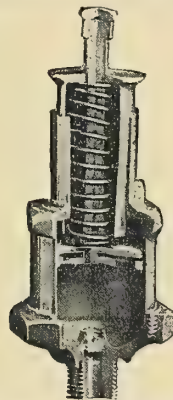
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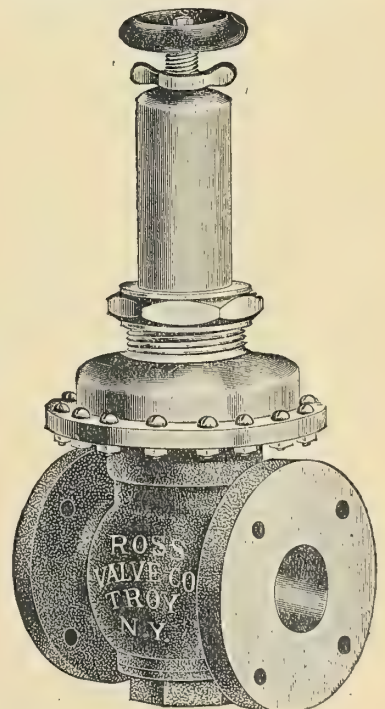
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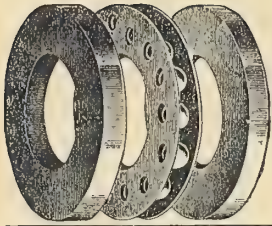
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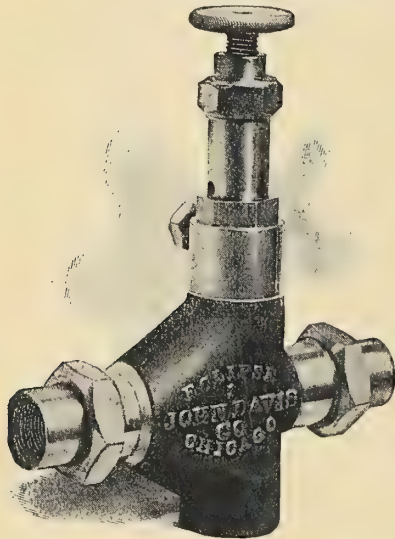
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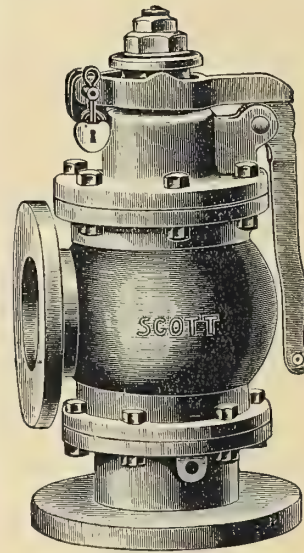
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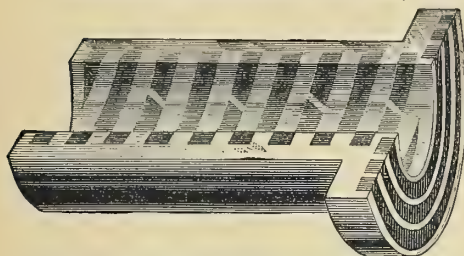
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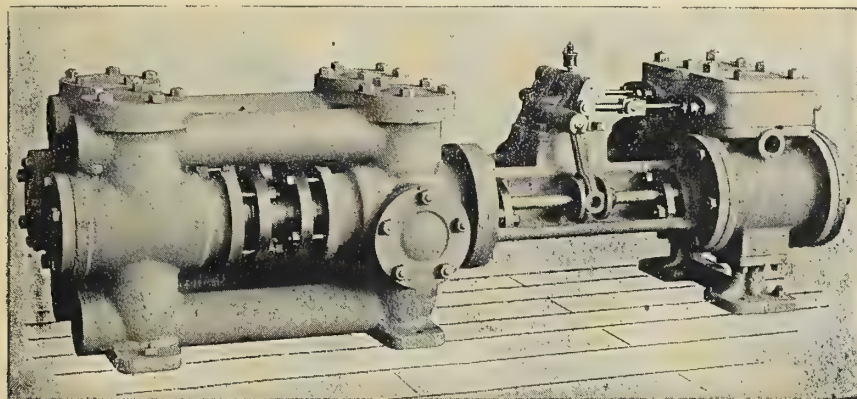
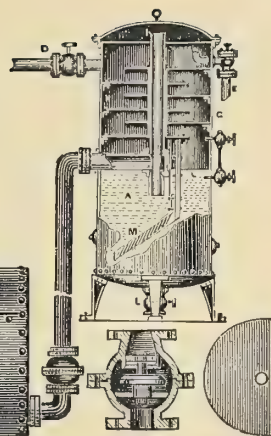
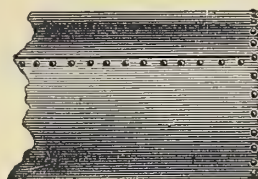
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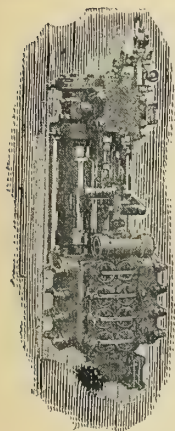
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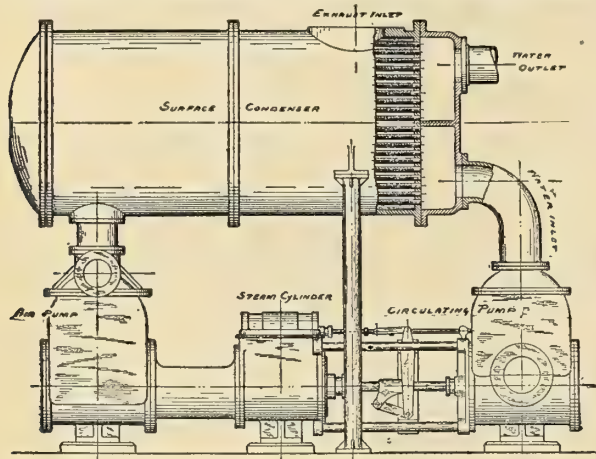
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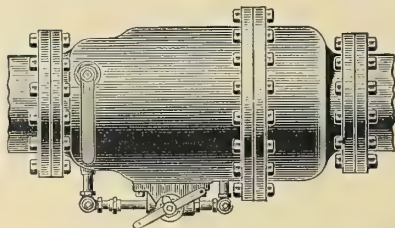
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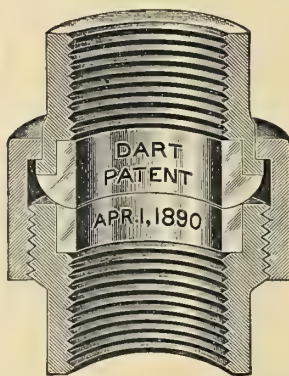
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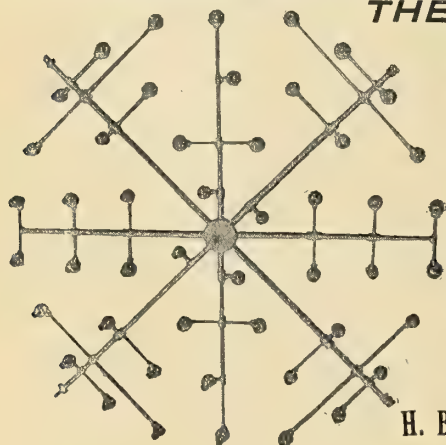
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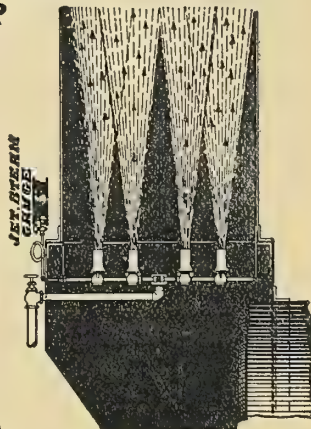
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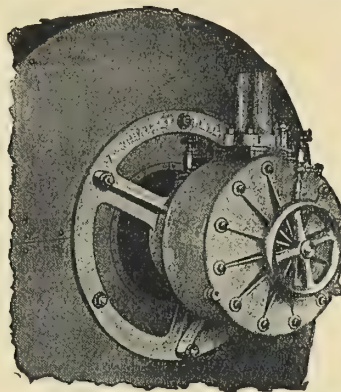
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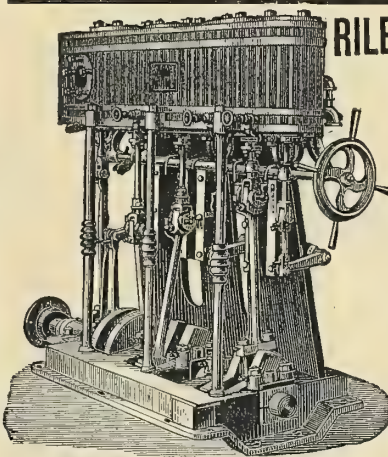
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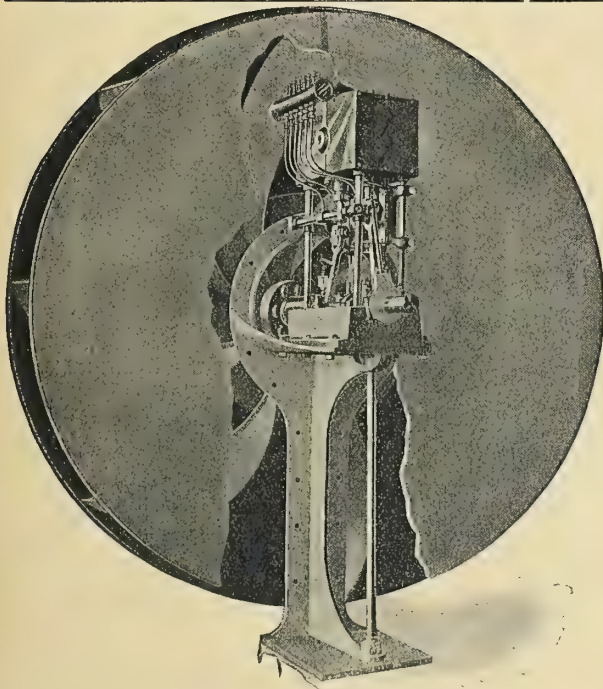
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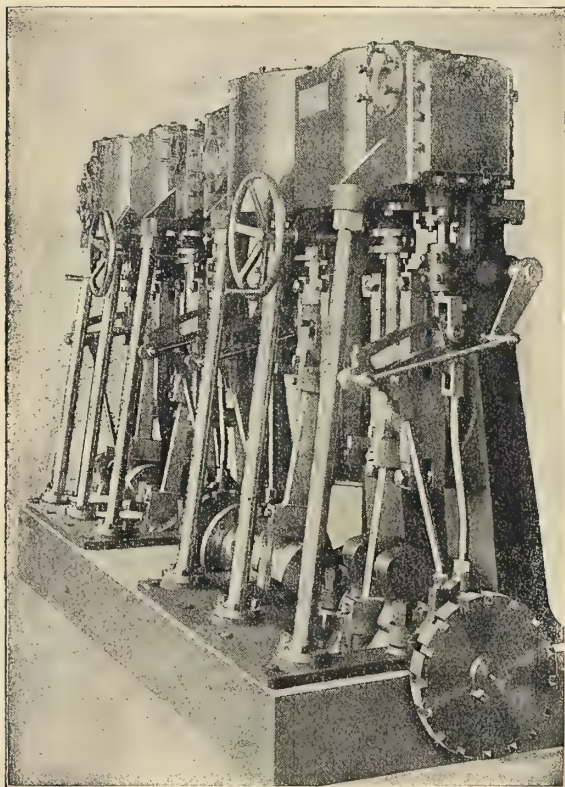
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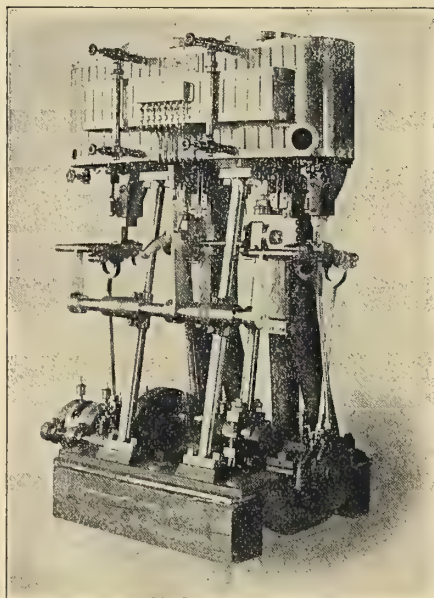


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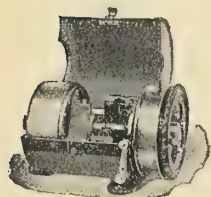
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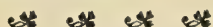
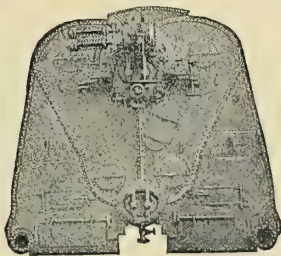
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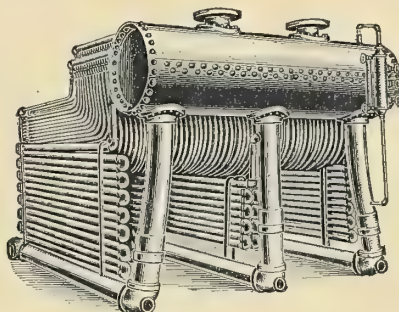
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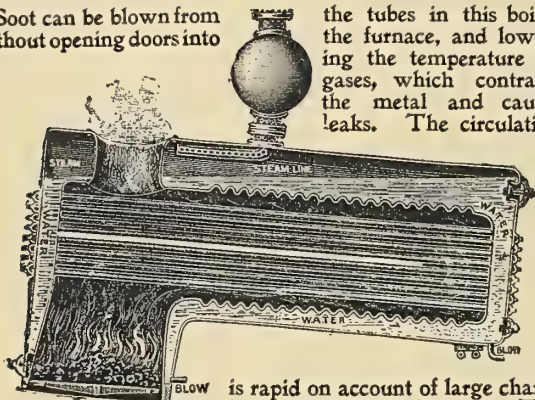
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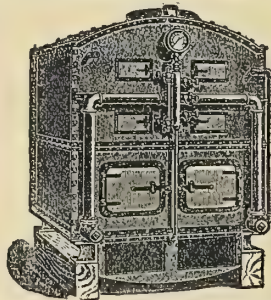
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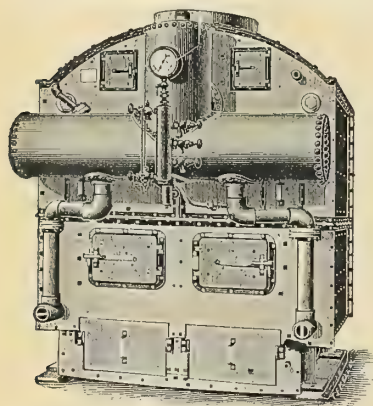
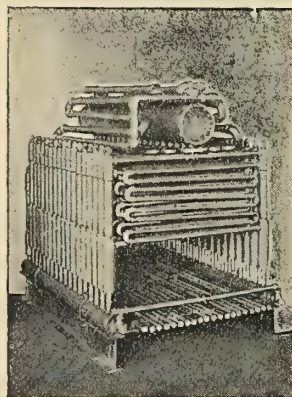
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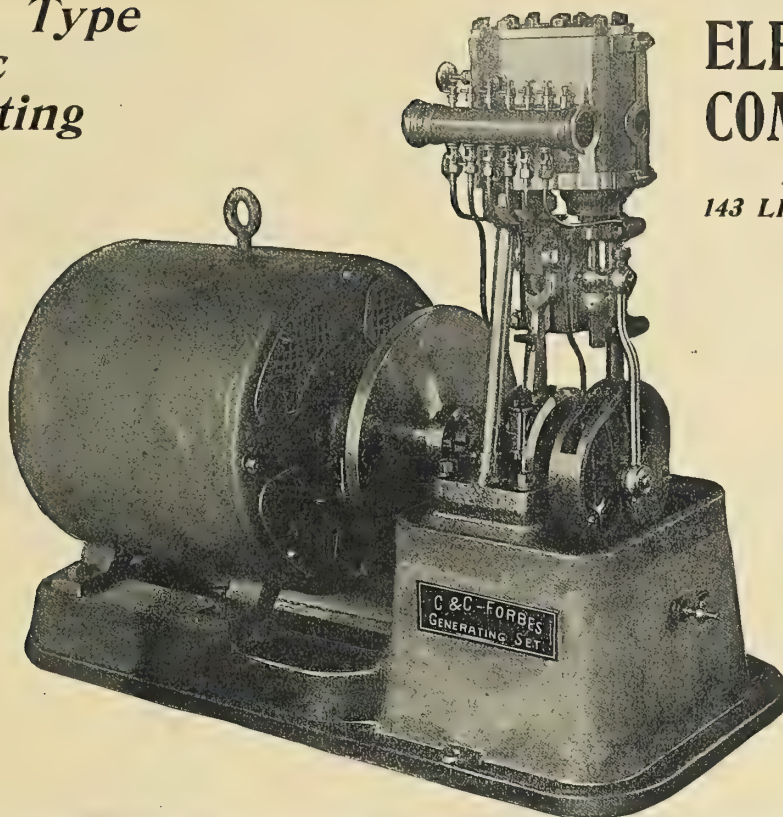
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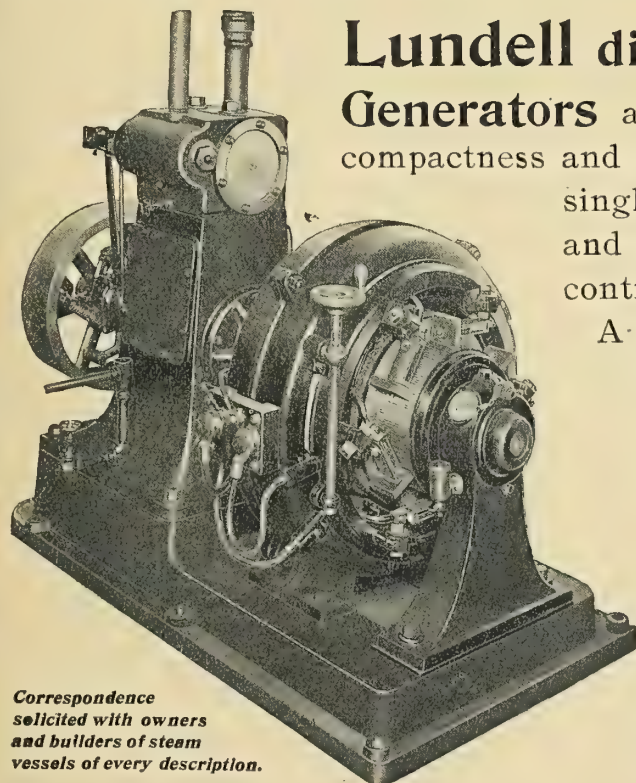
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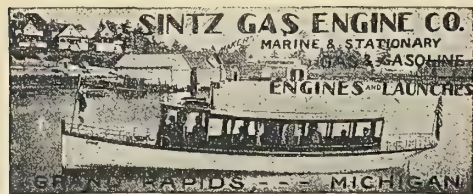
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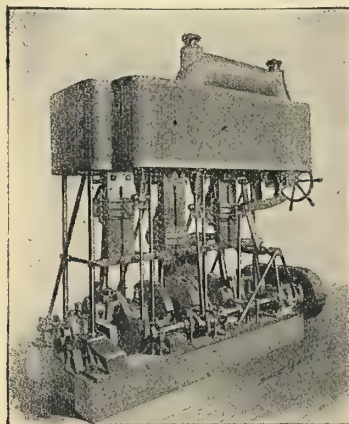
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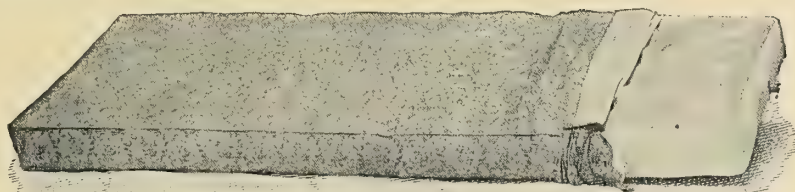
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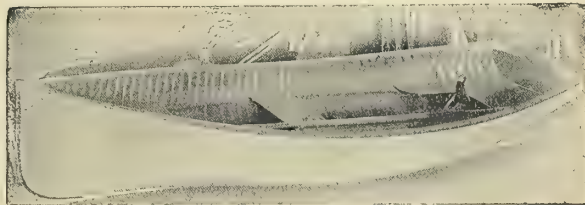
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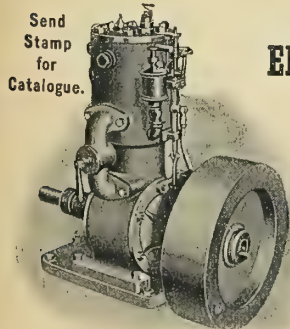
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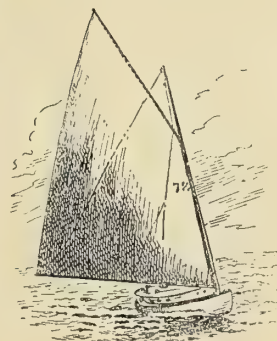
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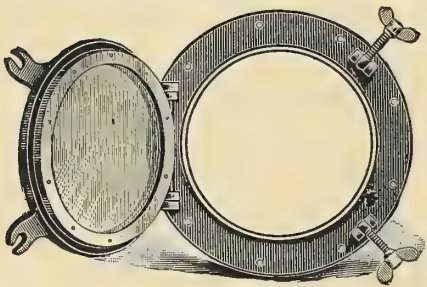
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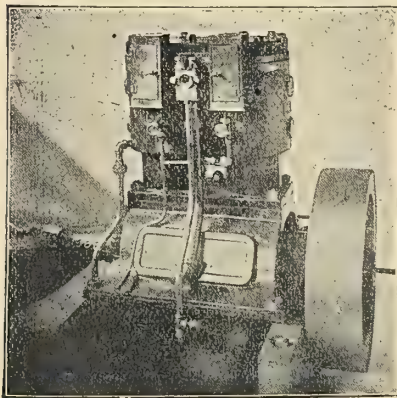
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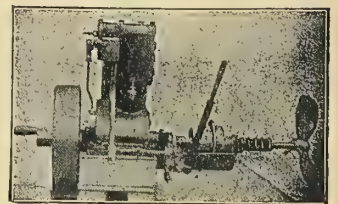
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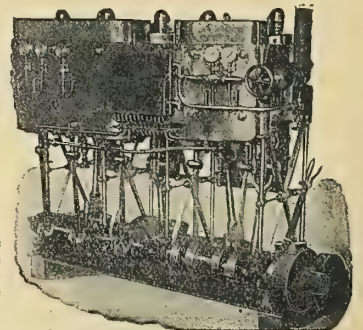
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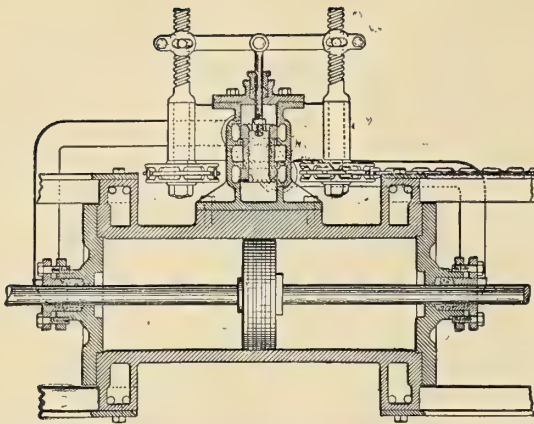
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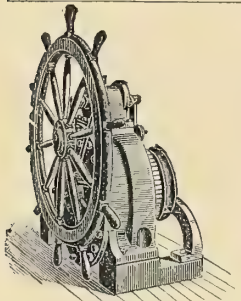
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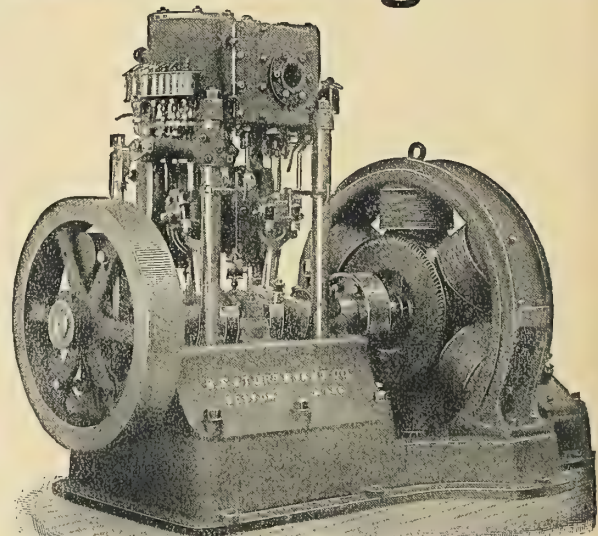
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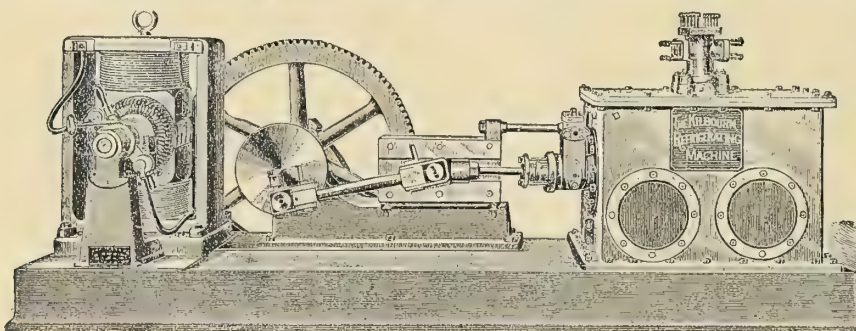
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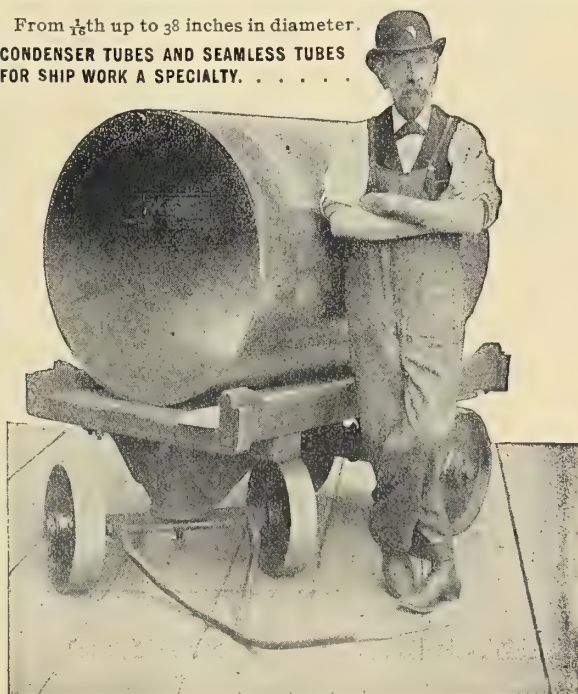
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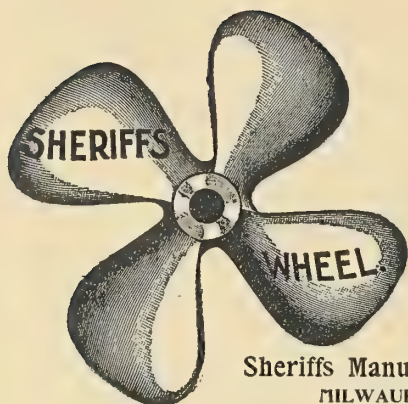
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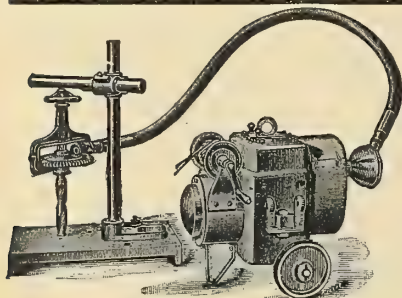
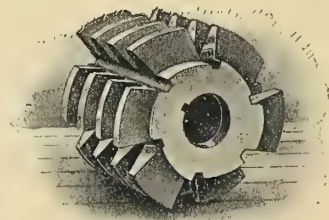
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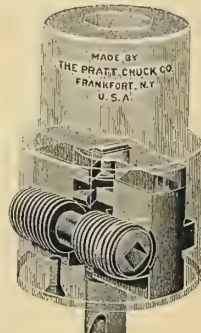
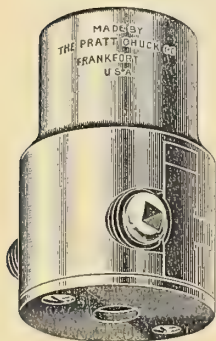
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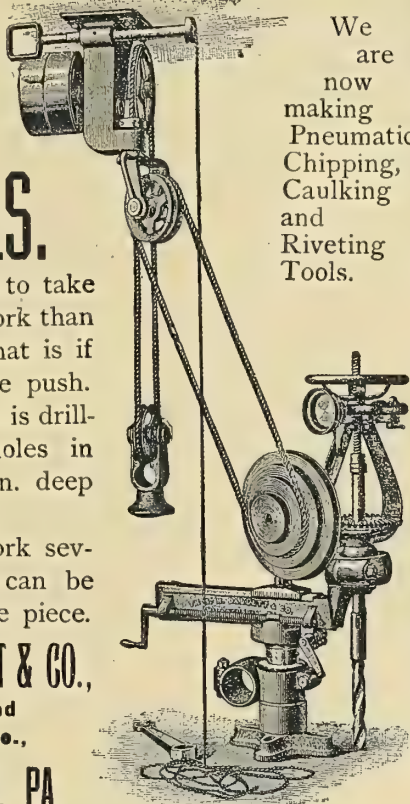
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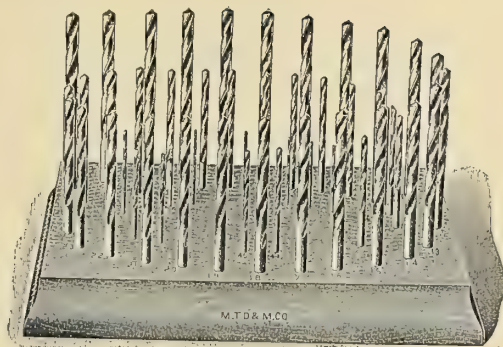
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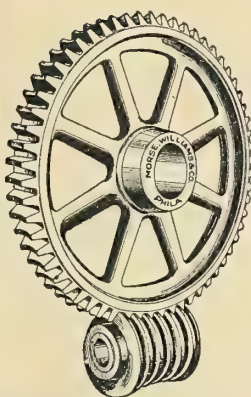
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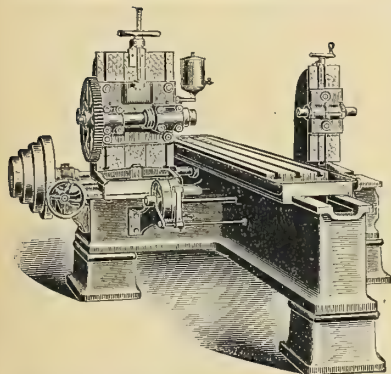


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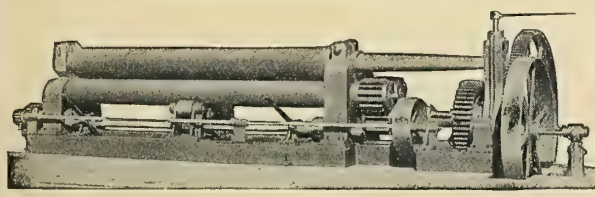
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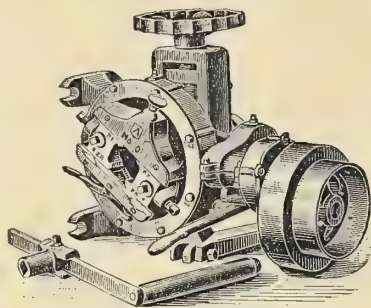
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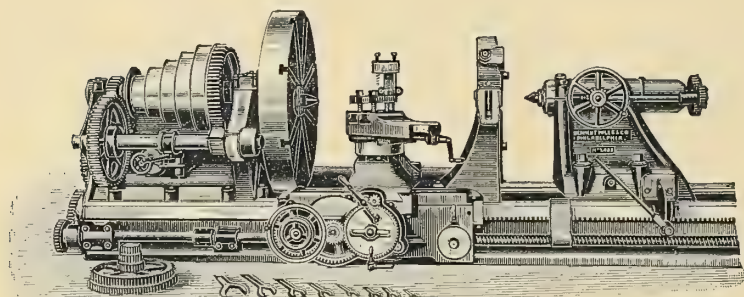
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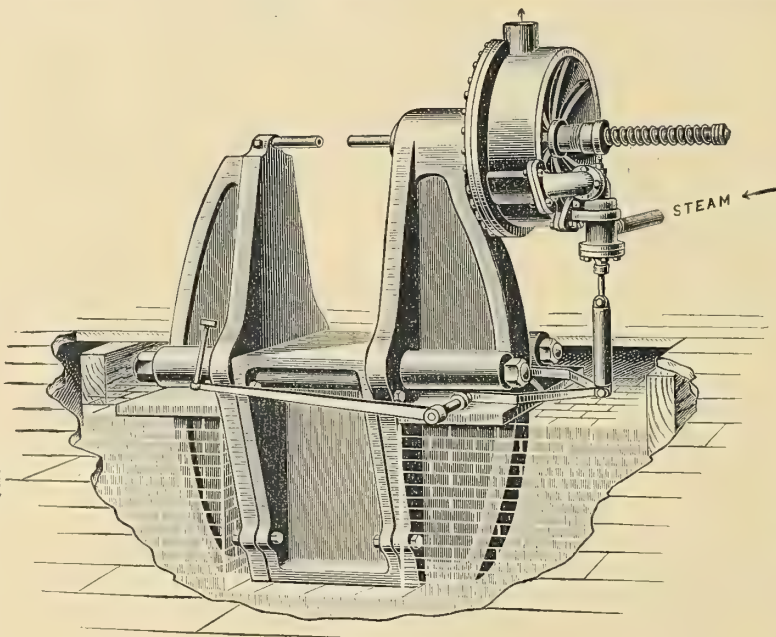
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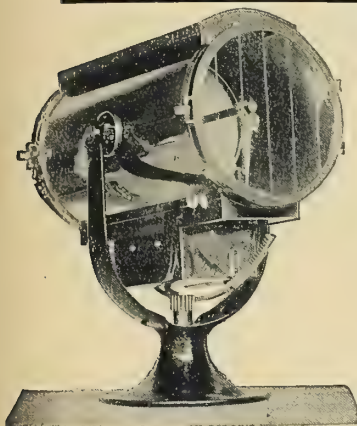
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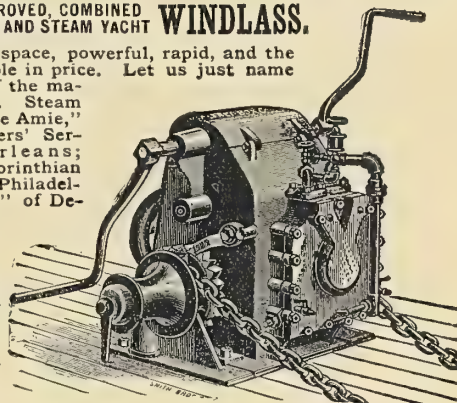
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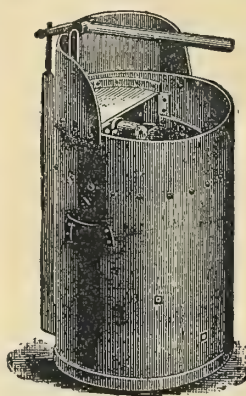
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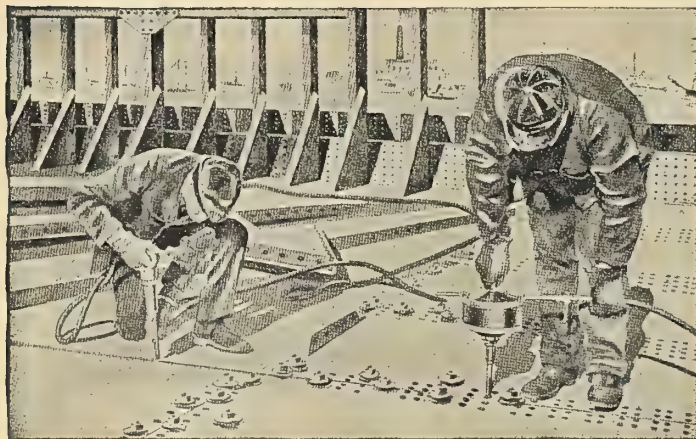
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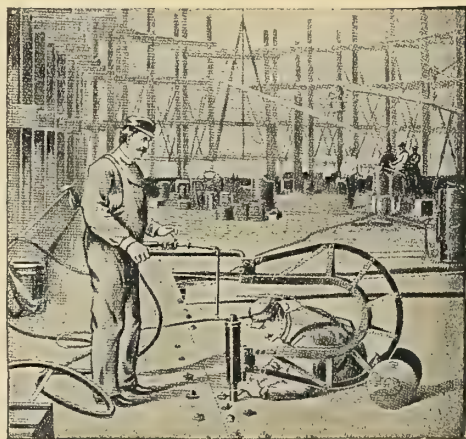
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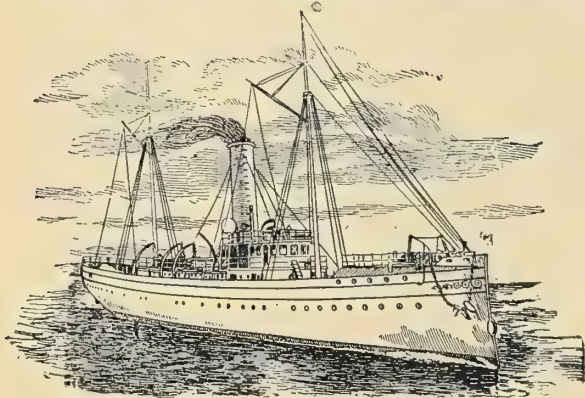
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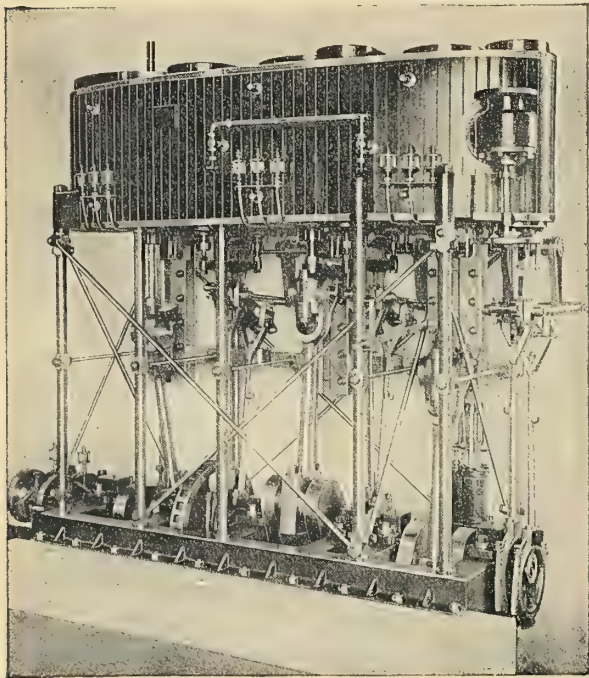
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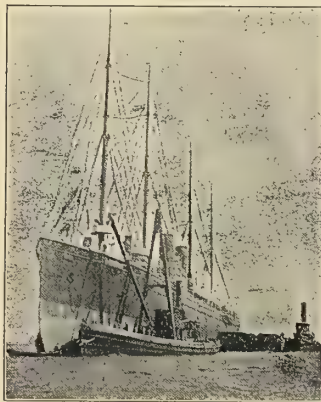
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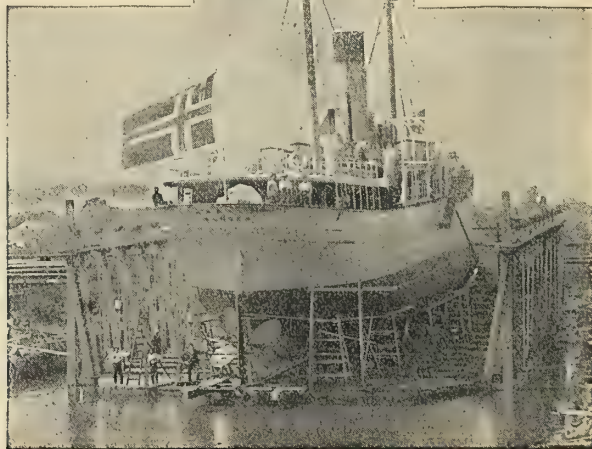
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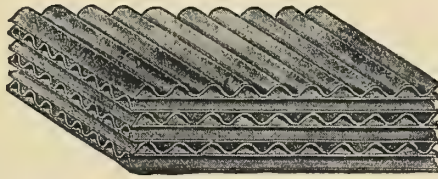
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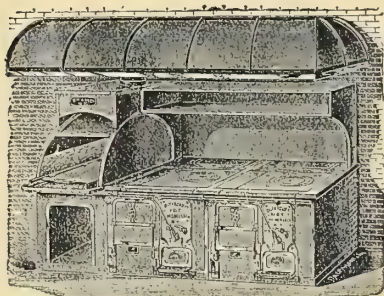
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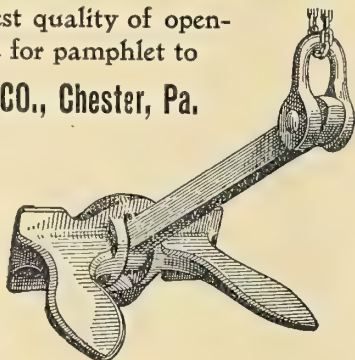
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## INDEX TO ADVERTISERS.

|                                                  |                    |
|--------------------------------------------------|--------------------|
| <b>ANCHORS.</b>                                  |                    |
| Baldt Anchor Co.....                             | 86                 |
| <b>ANCHOR CABLES.</b>                            |                    |
| Carr, J. B., Co., The.....                       | 59                 |
| <b>BEARINGS.</b>                                 |                    |
| Ball Bearing Co., The.....                       | 64                 |
| Graphite Lubricating Co.....                     | 65                 |
| Pittsburg White Metal Co.....                    | 63                 |
| Ryan, J. J., & Co.....                           | inside front cover |
| Standard Brass Works.....                        | 72                 |
| <b>BOILERS.</b>                                  |                    |
| Almy Water Tube Boiler Co.....                   | 70                 |
| Boyer Patent Sectional Water Tube Boiler Co..... | 69                 |
| Clark, Edw. S.....                               | 70                 |
| De Puy, Captain M.....                           | 67                 |
| Kingsford Foundry & Machine Works.....           | 70                 |
| Rochester Machine Tool Works.....                | 70                 |
| Thorpe, Platt & Co.....                          | 69                 |
| Tonkin, J. J.....                                | 70                 |
| <b>BOILER COMPOUND.</b>                          |                    |
| Litofuge Manufacturing Co.....                   | 54                 |
| Metropolitan Boiler Compound Co.....             | 66                 |
| Warley, Thomas C., & Co.....                     | 59                 |
| <b>BOILER TUBES.</b>                             |                    |
| Shelby Steel Tube Co.....                        | 69                 |
| <b>BRASS AND COPPER.</b>                         |                    |
| Benedict & Burnham Mfg. Co.....                  | 77                 |
| Hungerford, U. T.....                            | 77                 |
| Merchant & Co.....                               | 77                 |
| Randolph & Clowes.....                           | 77                 |
| <b>CAPTAINS AND WINDLASSES.</b>                  |                    |
| Box, Alfred, & Co.....                           | 81                 |
| Hyde Windlass Co.....                            | outside back cover |
| <b>CONDENSERS.</b>                               |                    |
| Taunton Locomotive Mfg. Co.....                  | 66                 |
| <b>CORRESPONDENCE SCHOOLS.</b>                   |                    |
| International Correspondence Schools.....        | 82                 |
| <b>COTTON DUCK.</b>                              |                    |
| J. Spencer Turner Co.....                        | 75                 |
| <b>DRAUGHTSMEN'S SUPPLIES.</b>                   |                    |
| Altender, Theo., & Sons.....                     | 74                 |
| Keuffel & Esser Co.....                          | 58                 |
| <b>DREDGING.</b>                                 |                    |
| Morris & Cumings Dredging Co.....                | outside back cover |
| New York Dredging Co.....                        | outside back cover |
| <b>ELECTRICAL APPARATUS AND SUPPLIES.</b>        |                    |
| Barron, James S., & Co.....                      | 58                 |
| Beacon Lamp Co.....                              | 59                 |
| C & C Electric Co.....                           | 71                 |
| High Tension Electric Storage Co.....            | 72                 |
| Sturtevant, B. F. Co.....                        | 76                 |
| Sprague Electric Co.....                         | 71                 |
| Westinghouse Electric & Mfg. Co.....             | 57                 |
| Weston Electrical Instrument Co.....             | 55                 |
| <b>ENGINES—GASOLINE.</b>                         |                    |
| Riotte, C. C., Co.....                           | 74                 |
| <b>ENGINES—STEAM.</b>                            |                    |
| Cruickshank Engine Co.....                       | 68                 |
| Forbes, W. D., & Co.....                         | 67                 |
| Halsey, James T.....                             | 67                 |
| King, Charles L.....                             | 68                 |
| Morris Machine Works.....                        | 68                 |
| Paine, James H., & Son.....                      | 68                 |
| Riley & Cowley.....                              | 67                 |
| <b>FEED WATER PURIFIER.</b>                      |                    |
| Learmouth, Robert.....                           | 65                 |
| <b>FORGES.</b>                                   |                    |
| Crumlish Forge Co.....                           | 82                 |
| <b>FORGINGS AND CASTINGS.</b>                    |                    |
| Bethlehem Iron Co.....                           | 81                 |
| Frankford Steel Co.....                          | 81                 |
| Whitestone Forge & Construction Co.....          | 81                 |
| <b>GALVANIZING.</b>                              |                    |
| U. S. Electro-Galvanizing Co.....                | 56                 |
| <b>INDICATORS.</b>                               |                    |
| American Steam Gauge Co.....                     | 68                 |
| Robertson, James L., & Son.....                  | 54                 |
| <b>INJECTORS.</b>                                |                    |
| Eynon-Evans Manufacturing Co.....                | 64                 |
| Penberthy Injector Co.....                       | 61                 |
| <b>KEEL BLOCKS</b>                               |                    |
| Hegley Keel Block Co.....                        | 81                 |
| <b>LAMPS, SIGNALS AND FIXTURES.</b>              |                    |
| Lovell, F. H., & Co.....                         | 88                 |
| Porter's Sons, Wm.....                           | 88                 |
| Russell & Watson.....                            | 88                 |
| <b>LUBRICATION.</b>                              |                    |
| Dixon, Joseph, Crucible Co.....                  | 53                 |
| <b>LUBRICATORS.</b>                              |                    |
| Lackawanna Lubricator Co.....                    | 63                 |
| Phillips, W. P., & Co.....                       | 63                 |

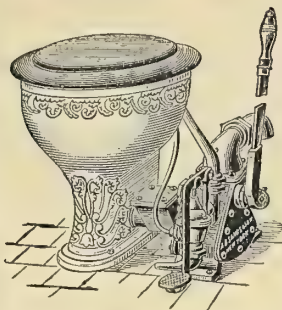
(Continued on next page.)

## INDEX TO ADVERTISERS—(Continued.)

|                                                        |    |
|--------------------------------------------------------|----|
| <b>LUMBER.</b>                                         |    |
| Kells, Thomas, & Sons.....                             | 81 |
| <b>MARINE GLASSES.</b>                                 |    |
| Bausch & Lomb Optical Co.....                          | 62 |
| <b>MARINE RAILWAYS.</b>                                |    |
| Crane's Sons, Theodore A.....                          | 84 |
| Tebbo's Dry Dock Co.....                               | 84 |
| <b>MARINE RAILWAY BUILDERS.</b>                        |    |
| Crandall, H. I., & Son.....                            | 84 |
| <b>MARINE STORES AND SUPPLIES.</b>                     |    |
| Carpenter, George B., & Co.....                        | 75 |
| Edson Mfg. Co.....                                     | 74 |
| Durkee, Chas. D., & Co.....                            | 74 |
| Marine Manufacturing & Supply Co.....                  | 74 |
| <b>MATTRESSES AND CUSHIONS.</b>                        |    |
| Mechanical Fabric Co.....                              | 73 |
| <b>METAL POLISH.</b>                                   |    |
| Bertram's Oil Polish Co.....outside back cover         |    |
| Rath Mfg. Co.....                                      | 63 |
| <b>MISCELLANEOUS.</b>                                  |    |
| Blickensderfer Mfg. Co.....                            | 59 |
| Great Lakes Register.....                              | 88 |
| <b>NON-CONDUCTING COVERINGS.</b>                       |    |
| Keasbey, Robert A.....                                 | 67 |
| New Jersey Asbestos Co.....                            | 59 |
| New York Asbestos Mfg. Co.....                         | 85 |
| <b>OIL FILTERS.</b>                                    |    |
| Burt Manufacturing Co.....                             | 54 |
| <b>PACKING.</b>                                        |    |
| Boston Belting Co.....                                 | 62 |
| Brandt, Randolph.....                                  | 60 |
| Chesterton, A. W., & Co.....                           | 62 |
| Garlock Packing Co.....                                | 60 |
| Katzenstein, L., & Co.....                             | 60 |
| Mould, Henry S., Co.....                               | 60 |
| Peerless Rubber Mfg. Co.....                           | 57 |
| Restein, Clement, & Co.....                            | 62 |
| U. S. Metallic Packing Co.....                         | 60 |
| <b>PAINTS AND PRESERVATIVES.</b>                       |    |
| American Pegamoid Co.....                              | 88 |
| <b>PIPES AND FITTINGS.</b>                             |    |
| Dart, E. M., Manufacturing Co.....                     | 66 |
| <b>PNEUMATIC TOOLS.</b>                                |    |
| American Pneumatic Tool Co.....                        | 82 |
| Chicago Pneumatic Tool Co.....                         | 82 |
| <b>PROFESSIONAL CARDS.</b>                             |    |
| Gardner & Cox.....                                     | 59 |
| Hillman, Gustav.....                                   | 59 |
| Roelker, H. B.....                                     | 59 |
| <b>PROPELLER WHEELS.</b>                               |    |
| Reeves, Paul S., & Son.....                            | 78 |
| Sheriffs Mfg. Co.....                                  | 78 |
| <b>PUMPS.</b>                                          |    |
| Deane Steam Pump Co.....inside front cover             |    |
| Snider-Hughes Co.....                                  | 65 |
| Snow Steam Pump Works.....                             | 65 |
| Worthington, Henry R.....                              | 65 |
| <b>RANGES—SHIP AND GALLEY.</b>                         |    |
| Duparquet, Huot & Moneuse Co.....                      | 86 |
| <b>REFRIGERATING MACHINES.</b>                         |    |
| Kilbourn Construction Co.....                          | 76 |
| <b>ROPE AND CORDAGE.</b>                               |    |
| American Manufacturing Co.....inside front cover       |    |
| <b>SAIL MAKERS.</b>                                    |    |
| Fogg, M. W.....                                        | 75 |
| Hemmenway, S., & Son.....                              | 75 |
| Estate of John Harrison.....                           | 75 |
| <b>SEARCH LIGHTS.</b>                                  |    |
| Carlisle & Finch Co.....                               | 81 |
| <b>SHIP BUILDERS.</b>                                  |    |
| Atlantic Works.....                                    | 83 |
| Chicago Ship Building Co.....                          | 85 |
| Cleveland Ship Building Co.....                        | 85 |
| Cramp, Wm., & Sons, Ship and Engine Building Co... 85  |    |
| Delaware River Iron Ship Building & Engine Co... 83    |    |
| Detroit Dry Dock Co.....inside back cover              |    |
| Fletcher, W. & A. Co.....                              | 83 |
| Fore River Engine Co.....                              | 84 |
| Gas Engine & Power Co., C. L. Seabury & Co., Con... 72 |    |
| Globe Iron Works.....                                  | 84 |
| Harlan & Hollingsworth Co.....                         | 83 |
| Hillman, Chas., Ship and Engine Building Co..... 85    |    |
| Marvel, T. S., & Co.....                               | 85 |
| Neafie & Levy Ship & Engine Building Co..... 85        |    |
| Newport News Ship Building and Dry Dock Co... 83       |    |
| Nixon, Lewis.....                                      | 85 |
| <b>SHIPSMITHS.</b>                                     |    |
| Brown & Miller.....                                    | 72 |
| Morse Iron Works Co.....                               | 84 |

(Continued on next page.)

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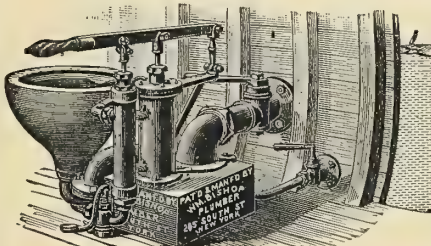
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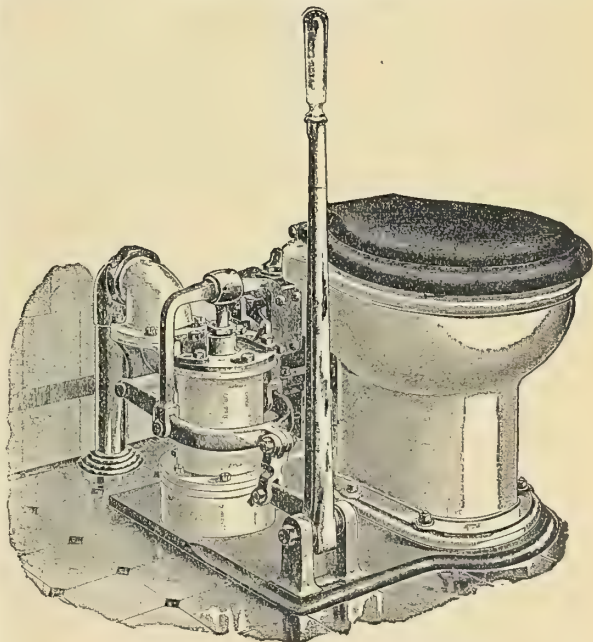
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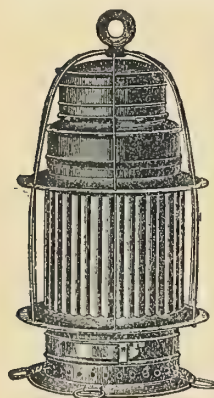
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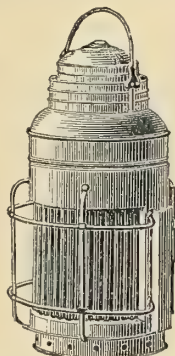
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## INDEX TO ADVERTISERS—(Continued.)

### SPEED-CONTROLLING APPARATUS.

Monarch Mfg. Co. .... 68

### STEAM CIRCULATOR.

Bloomsburg, N., & Co. .... 66

### STEAM FITTINGS.

Ashton Valve Co. .... inside front cover  
Coldwell-Wilcox Co. .... 59  
Craig, William ..... 66  
Davis, G. M., & Co. .... inside front cover  
Davis, John, Co. .... 64  
Homestead Valve Manufacturing Co. .... 60  
Mason Regulator Co. .... 52  
Ross Valve Co. .... 63  
Stephens, Roe, Manufacturing Co. .... 64

### STEAM TRAPS.

Haines, W. S., Co. .... 52-53

### STEERING APPARATUS.

Pawling & Harnischfeger. .... 76  
Queen City Engineering Co. .... 76  
Waters, George H. .... 76

### TOWING AND TRANSPORTATION.

Luckenbach, Lewis, .... outside back cover

### TOOLS—BENCH.

Coes, Loring, & Co. .... 78  
Hammacher, Schlemmer & Co. .... 83  
Morse Twist Drill & Machine Co. .... 79  
Pratt Chuck Co. .... 78  
Stow Mfg. Co. .... 78  
Williams, J. H., & Co. .... outside back cover

### TOOLS—MACHINE.

Armstrong Mfg. Co. .... 80  
Bement, Miles & Co. .... 80  
Bethlehem Foundry & Machine Co. .... 80  
Dallett, Thos. H., & Co. .... 79  
Niles Tool Works Co. .... 79  
Pratt & Whitney Co. .... 79

### VERMIN DESTROYERS.

Allison Chemical Co. .... 59

### WATER CLOSETS.

Bishop's, Wm., Sons. .... 87  
McCambridge & Co., L't'd. .... 87  
Sands, Alfred B., & Son. .... 87

### WORM GEARING.

Morse, Williams & Co. .... 79

### YACHT AND BOAT BUILDERS.

Crosby, H. Manley. .... 73  
Daimler Manufacturing Co. .... 73  
Marine Vapor Engine Co. .... 73  
Mather, C. B., & Co. .... 73  
Mianus Electric Co. .... 73  
Mosher, Chas. D. .... 74  
Sintz Gas Engine Co. .... 72  
Truscott Boat Mfg. Co. .... 74  
Wignall, Jas. C. .... 73

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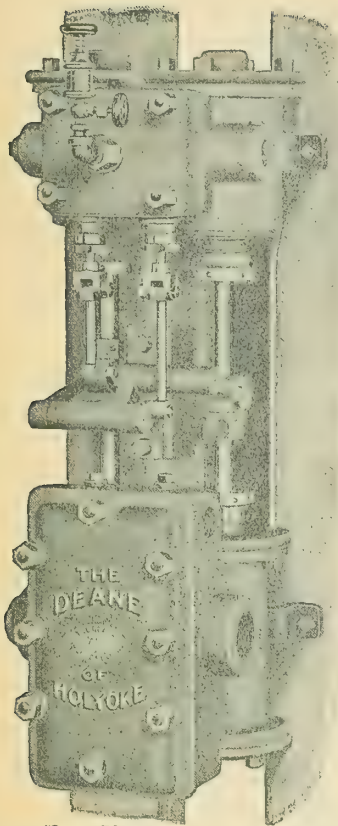


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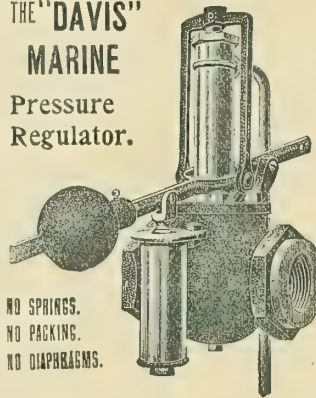
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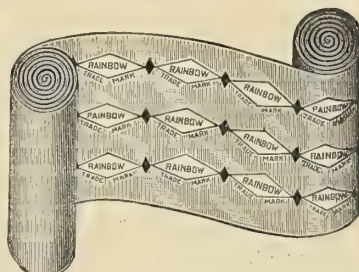


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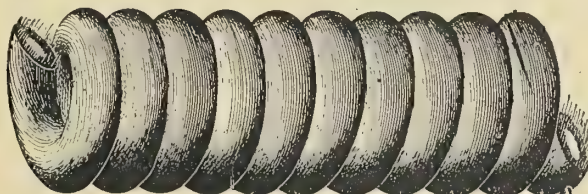
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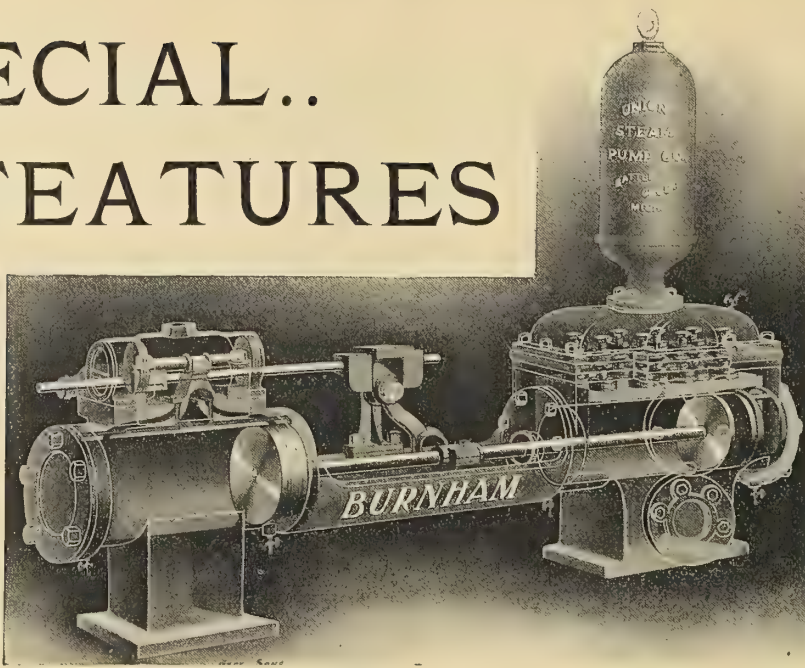
16-24 Woodward Ave., Detroit, Mich.

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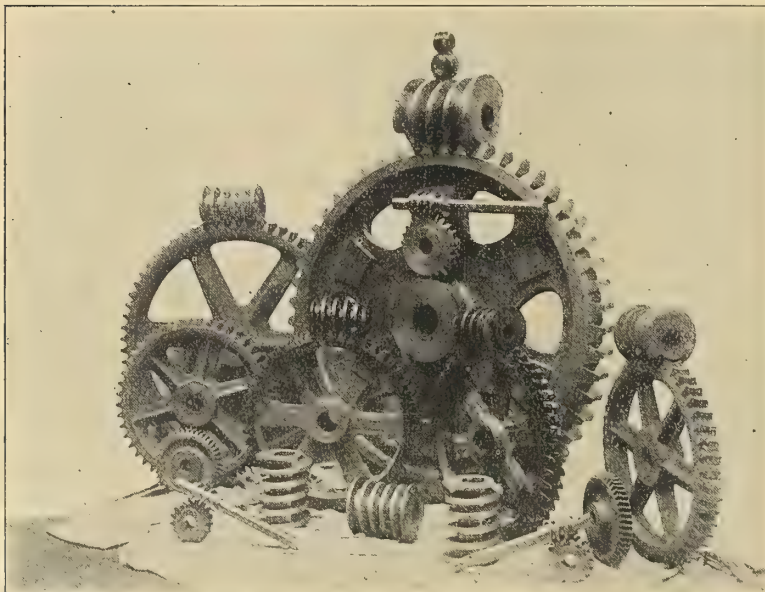
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We offer the only Steam Pump having a flat-faced or Slide Steam Valve, with a minimum of clearance, which will not strike the heads under full steam, where the pump is in labor and the suction may become broken, or that will not injure itself from load to no load.

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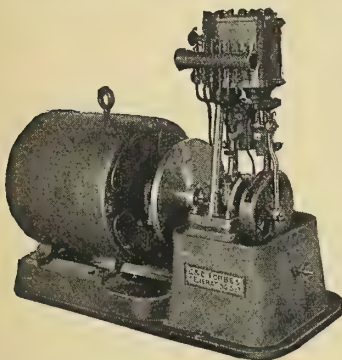
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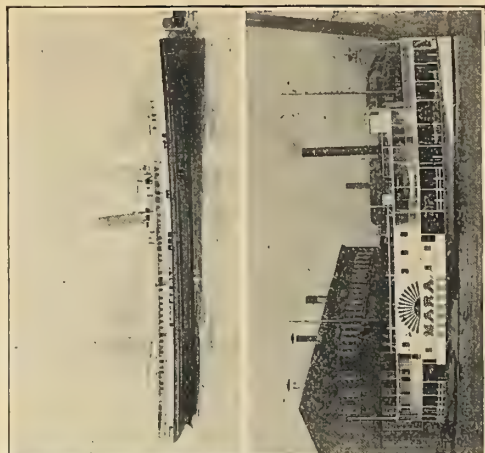
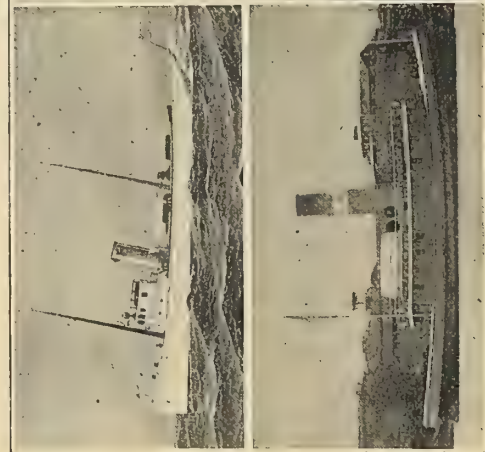
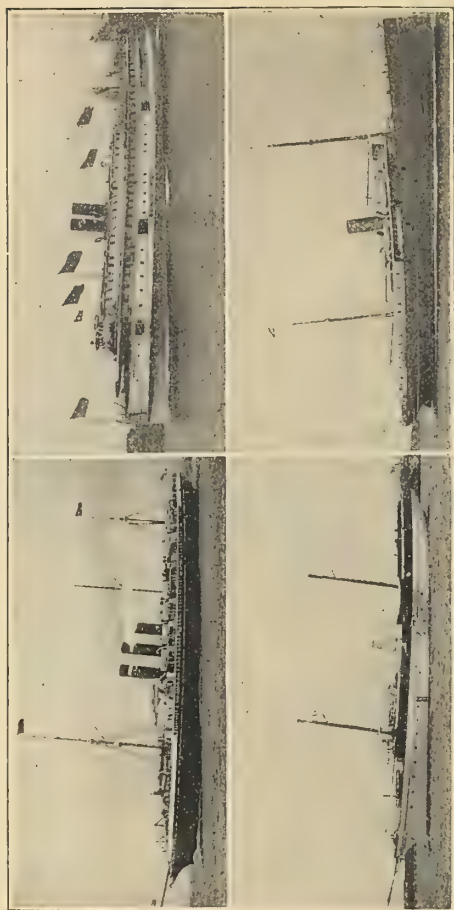
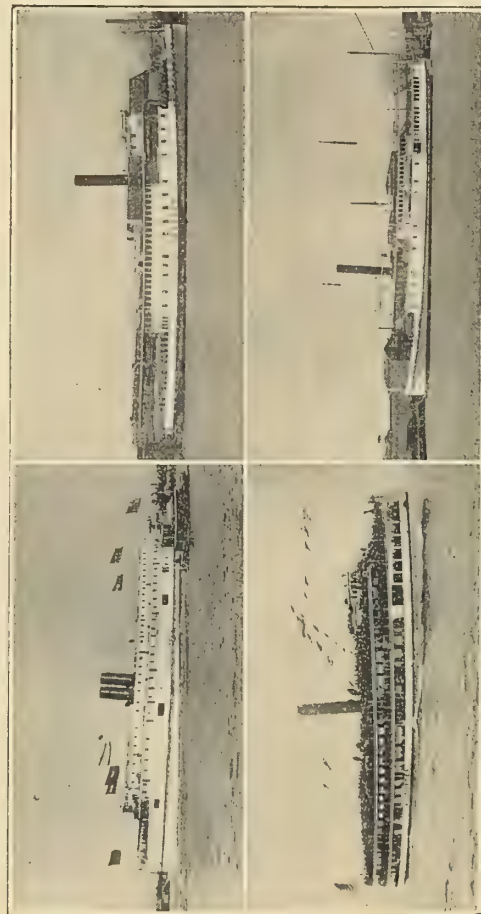
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FOR HEATING AND CIRCULATING THE WATER IN STEAM BOILERS

GIVES 5 TO 15 PER CENT. INCREASED STEAMING CAPACITY OR SAVING IN COAL CONSUMPTION.

## THE IMPROVED ANNULAR STEAM JET

FOR INDUCED DRAFT. 15 TO 25 PER CENT. INCREASE IN POWER.



PHOTOGRAPHS OF STEAMERS USING CIRCULATORS OR STEAM JETS.

# This Circulating Apparatus

Maintains a constant circulation while boiler is being fed, giving temperatures of 270° to 320° at bottom. Preventing leaks, increasing steaming capacity and saving coal and cost of repairs, sufficient to pay for the apparatus in six months. Stops foaming or priming and pitting. The steam heating attachment using steam from donkey boiler will heat the water in main boiler to 200° in half an hour from cold water while fires are being started and be ready for steam in an hour without straining boiler.

# The Improved Annular Steam Jet

Very powerful and economical; easily installed; moderate in price; occupies no valuable space and requires no attention. Does not effect the natural draft and is always ready at a moment's notice. Orders filled promptly and on short notice. Satisfaction guaranteed.

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Patentees and Manufacturers  
**112 35th Street,**  
**NEWPORT NEWS, VA.**

CIRCULATORS NOW IN USE IN 87 BOILERS.

| Name of STEAMER    | No. of Boilers | ROUTE.                   | OWNERS.                                           | BUILDERS.                            |
|--------------------|----------------|--------------------------|---------------------------------------------------|--------------------------------------|
| City of Chester    | 2              | Wilmington, Phila.       | Wilmington Steam Boat Co.                         | Harlan & Hollingsworth Company.      |
| Brandywine         | 2              | New York Fishing Banks   | Al Foster Steam Boat Co.                          | "                                    |
| Al Foster          | 2              | New Haven                | New Haven Line                                    | "                                    |
| Richard Peck       | 6              | "                        | N. J. Central R. R. Co.                           | "                                    |
| Mauchunk Ferry     | 2              | "                        | Jersey City                                       | "                                    |
| Easton Ferry       | 2              | "                        | "                                                 | "                                    |
| An Revolt          | 2              | Steam Yacht.             | Wm. I. Du Pont                                    | "                                    |
| Gloster S. S.      | 4              | U. S. Transport.         | Merchants' & Miners' Tr. Co.                      | Maryland Steel Company               |
| City of Lowell     | 6              | New York, New London.    | Norwich Line                                      | Bath Iron Works.                     |
| Supply S. S.       | 1              | U. S. Provision Ship.    | United States                                     | Wm. Cramp & Sons                     |
| Southwark S. S.    | 3              | New York Southampton.    | American Line                                     | Denny Bros., Dunbarton, Scot.        |
| Vale S. S.         | 9              | U. S. Auxiliary Cruiser. | "                                                 | J. & G. Thomson, Clydebank, Scot.    |
| Howard             | 4              | U. S. Transport          | Merchants' & Miners' Tr. Co.                      | Harlan & Hollingsworth Company       |
| Susquehanna        | 1              | Steam Yacht.             | Jos. Stickney                                     | "                                    |
| Pennsylvania S. S. | 1              | U. S. Transport          | American Line                                     | Wm. Cramp & Sons Co.                 |
| New York           | 2              | Pilot Boat.              | New York Pilots                                   | Harlan & Hollingsworth Company.      |
| Bluefields S. S.   | 1              | Baltimore, New York.     | Shriver Line                                      | E. J. Codd & Co., Baltimore.         |
| Juniauta S. S.     | 4              | U. S. Transport          | Merchants' & Miners' Tr. Co.                      | Harlan & Hollingsworth Company.      |
| Ericsson           | 1              | Baltimore, Philadelphia. | Ericsson Line                                     | Nearie & Levy Co.                    |
| Niagara            | 3              | Steam Yacht.             | Howard Gould                                      | Harlan & Hollingsworth Company.      |
| Transfer No. 11.   | 1              | Tug, New York.           | N. Y., N. H. & Hartford R. R.                     | Pusey & Jones Co.                    |
| " 12.              | 1              | Freight Ship.            | Chemical Co.                                      | "                                    |
| S. T. Morgan S. S. | 1              | Tug, Boston.             | Boston Tow Boat Co.                               | Harlan & Hollingsworth Company.      |
| Confidence         | 1              | Tug, Baltimore.          | P. Daugherty & Co.                                | Campbell & Zell Co.                  |
| S. S. Ajax         | 4              | Baltimore, Boston        | Merchants' & Miners' Tr. Co.                      | Harlan & Hollingsworth Company.      |
| Str. Flyer         | 1              | Oil Tank Str.            | Standard Oil Co.                                  | Delaware River Iron Shipbuilding Co. |
|                    |                | Seattle, Tacoma.         | Puget Sound and Columbia River Navigation Company | "                                    |

63 ANNULAR STEAM JETS NOW IN USE.

| Name of STEAMER.      | STACK. (Inches.) | ROUTE.                                           | OWNERS.                      | BUILDERS.                       |
|-----------------------|------------------|--------------------------------------------------|------------------------------|---------------------------------|
| City of Chester       | 51               | Wilmington, Phila.                               | Wilmington Steam Boat Co.    | Harlan & Hollingsworth Company. |
| Brandywine            | 48               | "                                                | "                            | "                               |
| Al Foster             | 64               | New York Fishing Banks, Al Foster Steam Boat Co. | "                            | "                               |
| City of Lowell        | 2-84 x 100       | New York, New London                             | Norwich Line                 | Bath Iron Works.                |
| S. S. Fairfax         | Donkey           | Baltimore, Boston.                               | Merchants' & Miners' Tr. Co. | Harlan & Hollingsworth Company. |
| Yankee Doodle         | 13x33            | Pleasure Yacht.                                  | McBride Bros.                | McBride Bros.                   |
| Frederica             | 25               | Philadelphia, Frederica.                         | Frederica Steam Boat Co.     | Nearie & Levy Co.               |
| Yacht                 | 15 1/2           | Lake Champlain                                   | W. J. McCaffrey              | "                               |
| S. S. Howard          | 13x33            | Baltimore, Boston.                               | Merchants' & Miners' Tr. Co. | Harlan & Hollingsworth Company. |
| Montauk               | 42               | Tug, New York Harbor.                            | Long Island Railroad Co.     | Nearie & Levy Co.               |
| Hampden Roads.        | 42               | Norfolk, Gloucester.                             | Old Dominion Steamship Co.   | Harlan & Hollingsworth Company. |
| Hatteras              | 42               | Tug, New York Harbor.                            | "                            | "                               |
| Millie K. Ridgeway    | 29               | Philadelpia                                      | Hartford Steam Boat Co.      | Nearie & Levy Co.               |
| Middletown            | 2-48             | Cuba                                             | "                            | "                               |
| Rein a de Los Angeles | 2-42             | Philadelphia, Seaford.                           | Denny Bros.                  | Chas. Hillman & Co.             |
| Endeavor              | 26               | Port Tampa, Fla.                                 | Plant Steamship Co.          | Newport News Shipbuilding Co.   |
| Margaret              | 39               | Revenue Cutter.                                  | Mexican Government           | Nearie & Levy Co.               |
| Donato Guerra         | 45               | Tug                                              | Standard Oil Co.             | Harlan & Hollingsworth Company. |
| Atlas                 | 48               | Providence, Fall River & Newport Steam Boat Co.  | "                            | "                               |
| Bay Queen.            | 50               | Zulia River Lake Maracabo, Venezuela.            | "                            | Pusey & Jones Co.               |
| Mara.                 | 17               | Whitehall, Lake Champlain.                       | Reading Railroad Co.         | Harlan & Hollingsworth Company. |
| R. D. Tisdale         | 60               | Tug                                              | Winthrop Steam Boat Co.      | Nearie & Levy Co.               |
| Catawissa             | 36               | "                                                | Jersey & Delaware Pilots.    | "                               |
| Plymouth              | 51               | "                                                | New York Pilots.             | "                               |
| Philadelphia          | 54               | "                                                | Old Dominion Steamship Co.   | Harlan & Hollingsworth Company. |
| New York              | 46               | "                                                | Kennebec River Line.         | Bath Iron Works.                |
| S. S. Princess Anne   | 96               | Boston & Bath, Me.                               | Merchants' & Miners' Tr. Co. | Harlan & Hollingsworth Company. |
| Lincoln               | 78               | Boston, Baltimore.                               | "                            | "                               |
| Juniauta S. S.        | 12x33            | "                                                | "                            | "                               |

# HOWDEN HOT DRAFT.

TOTAL INSTALLATIONS THROUGHOUT THE WORLD,

863 STEAMERS--2,424,200 HORSE POWER.

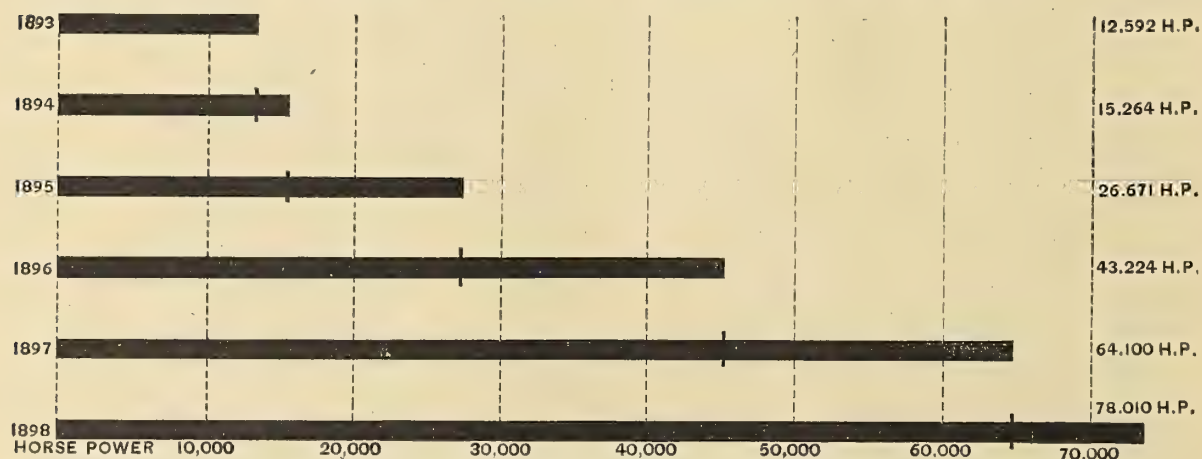
TOTAL INSTALLATIONS BY THE

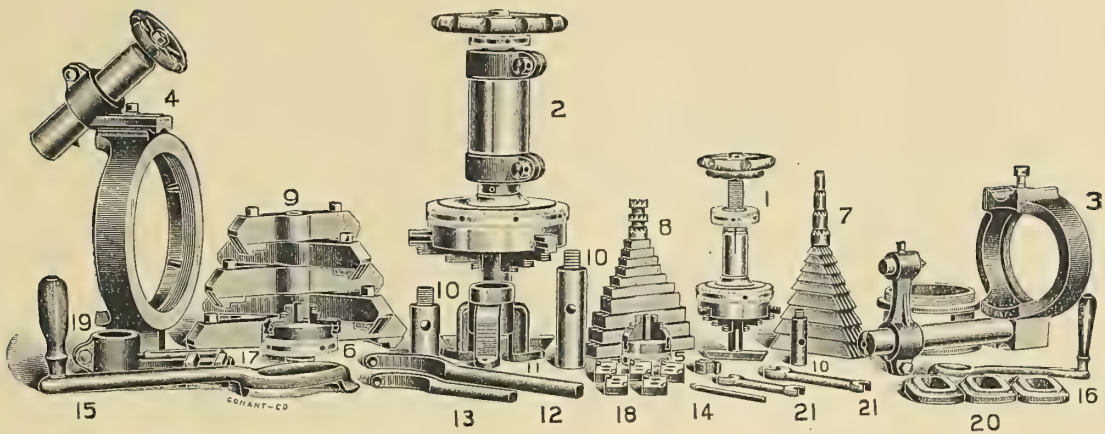
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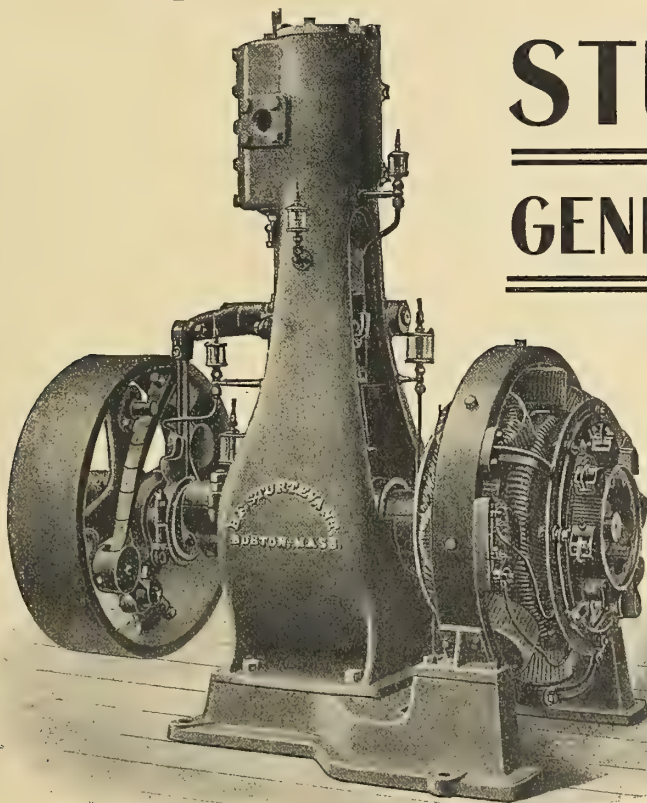




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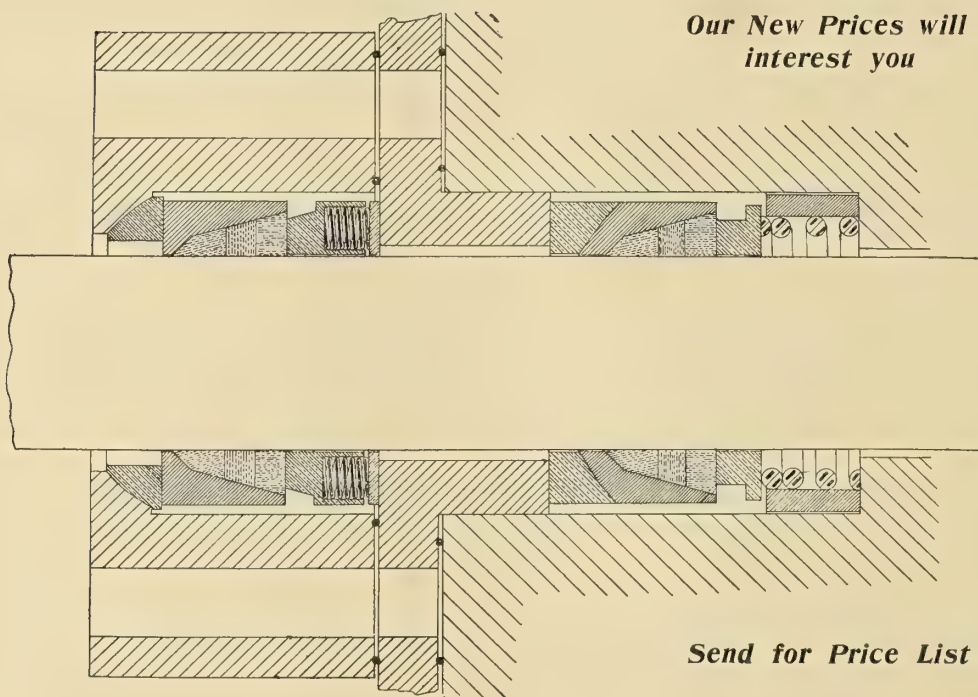
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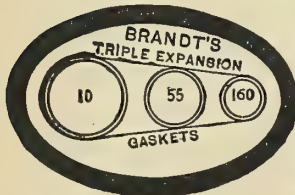
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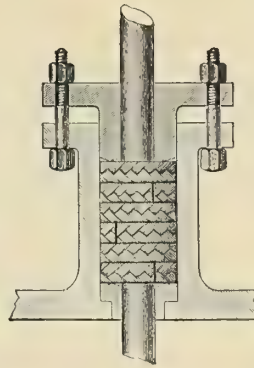
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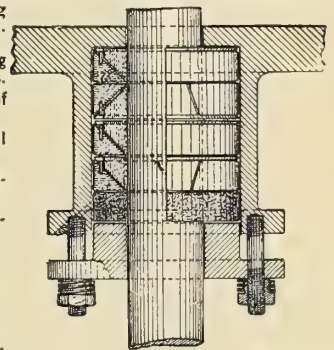
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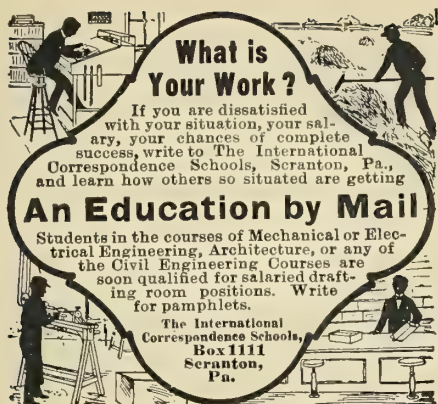
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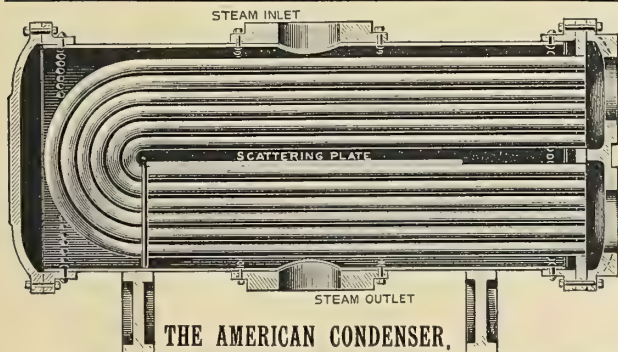
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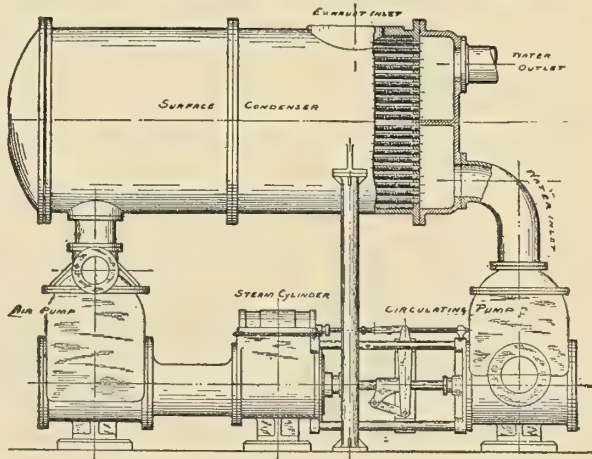
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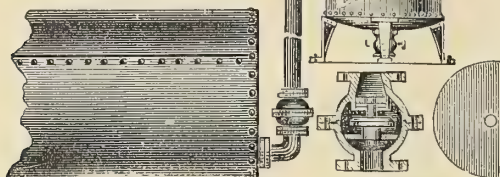
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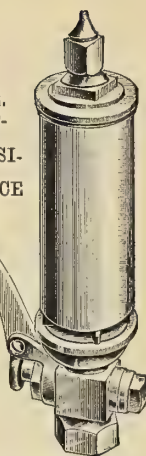
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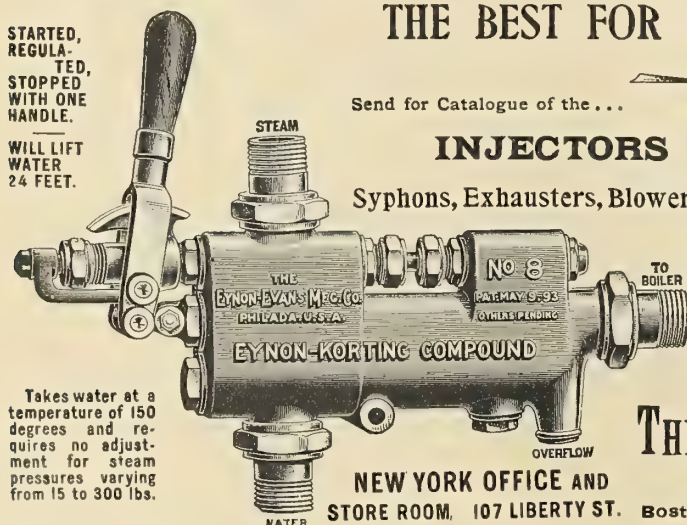
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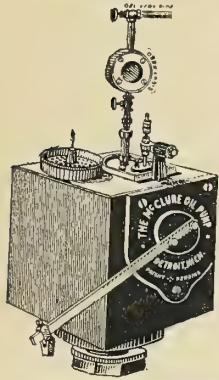
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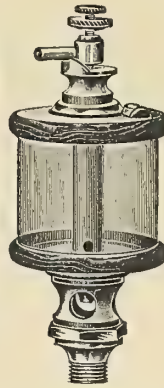
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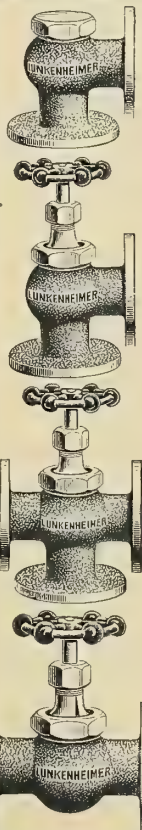
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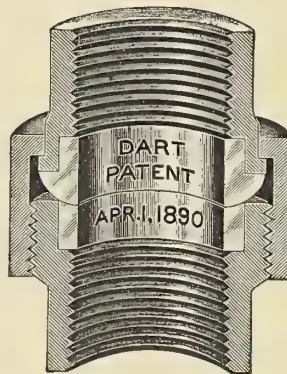
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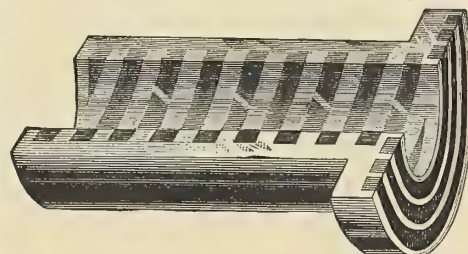
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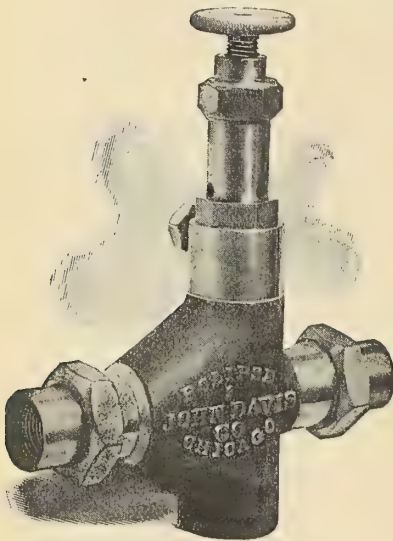
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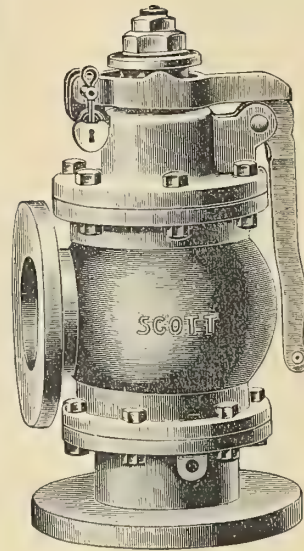
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Is made with a bevel seat to an angle of 45 degrees, and has a cam lever for raising valve off its seat when no pressure is on, or blowing off all steam when desired, as required by the U. S. Board of Supervisors and inspectors of steam vessels.

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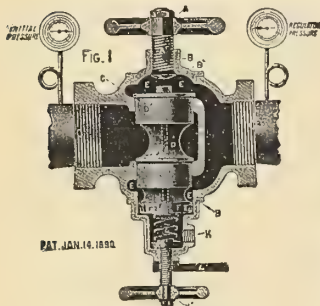
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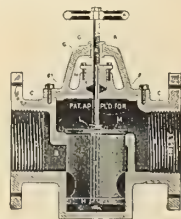
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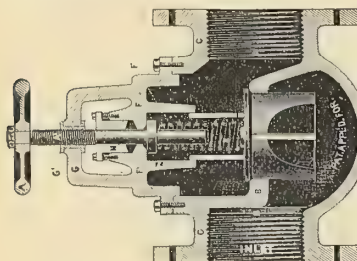
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Connect inlet side to pipe from boiler. Open screw A full to the top, then set desired pressure with screw H.



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These valves can be opened and closed with a small hand-wheel at highest pressure, and if desired to use these valves for throttling engines, etc., a lever will be put on instead of hand-wheel, without extra charge. These valves will shut off perfectly tight.



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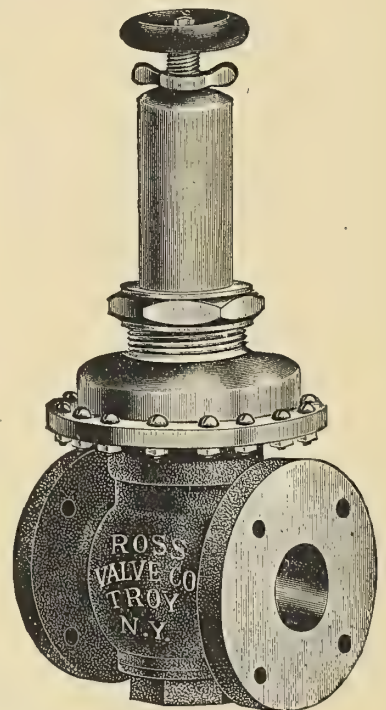
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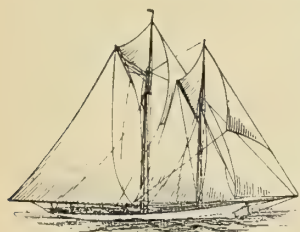
Steam  
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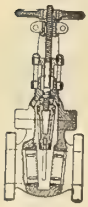
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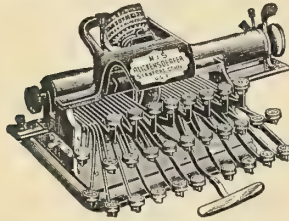
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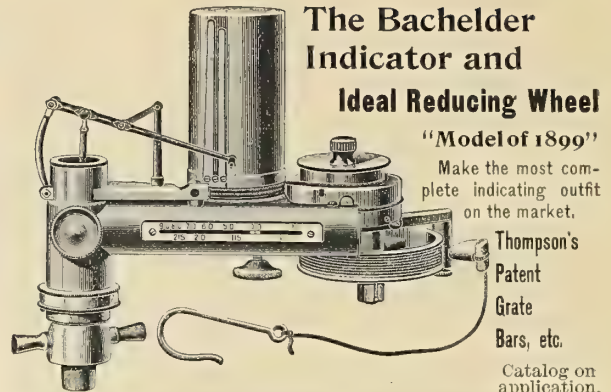
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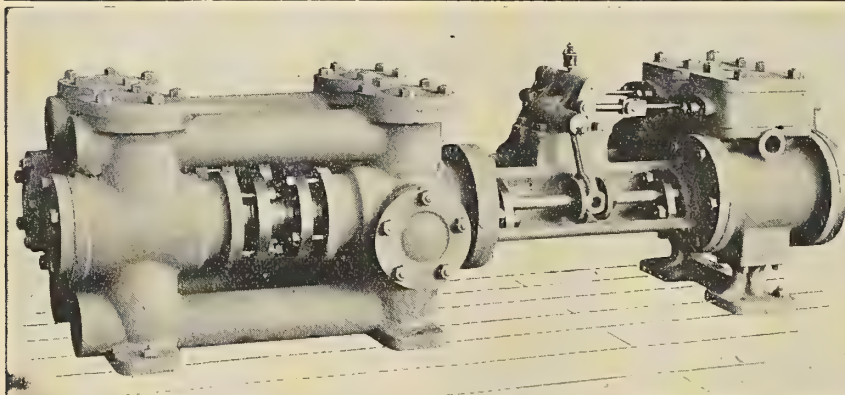
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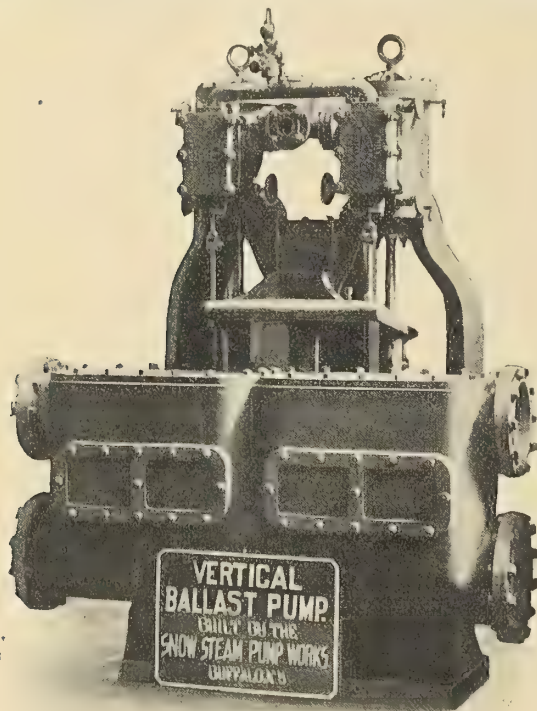
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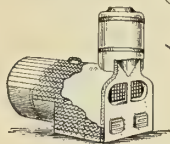
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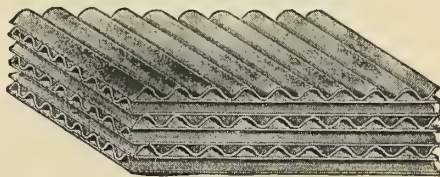
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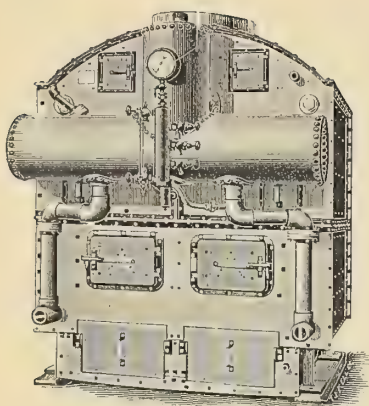
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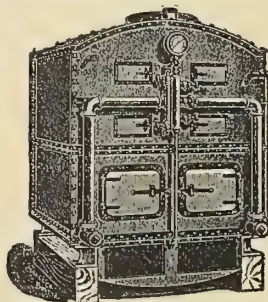
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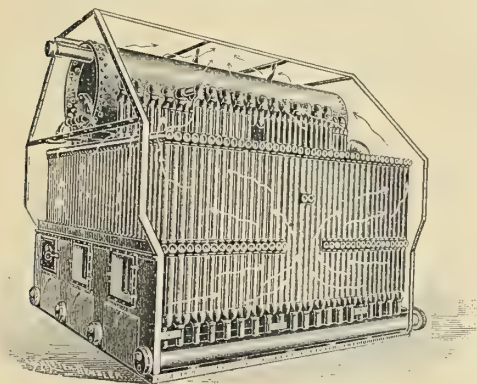
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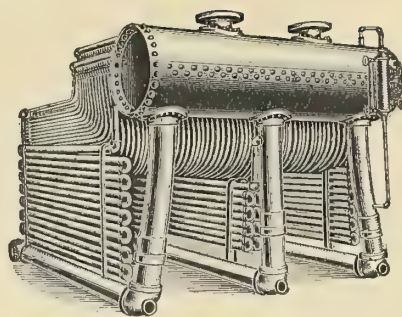
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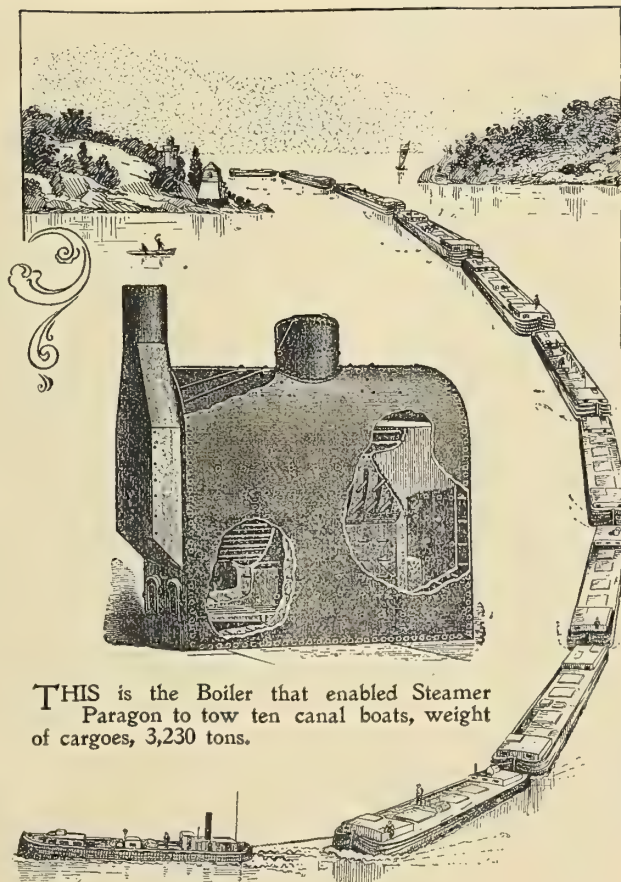
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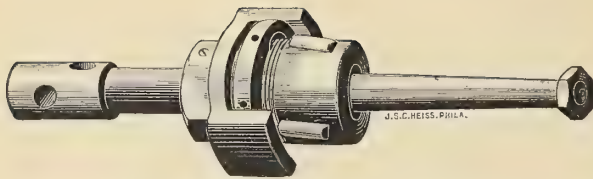
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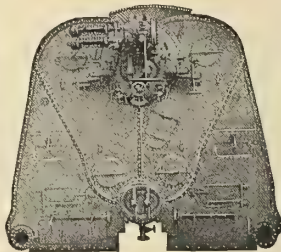
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600,000 Horse Power in Use.

FOUR OF THESE BOILERS WILL DEVELOP 9,000 I. H. P.

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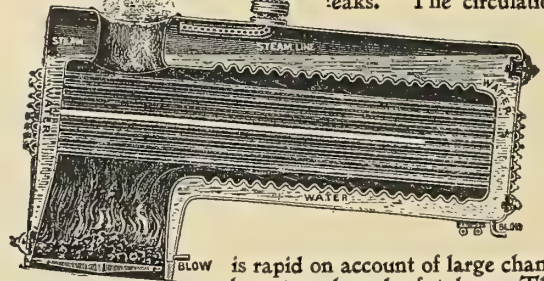


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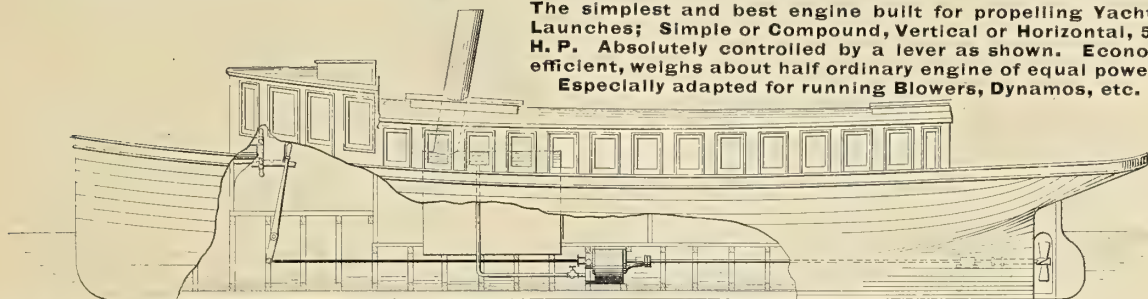
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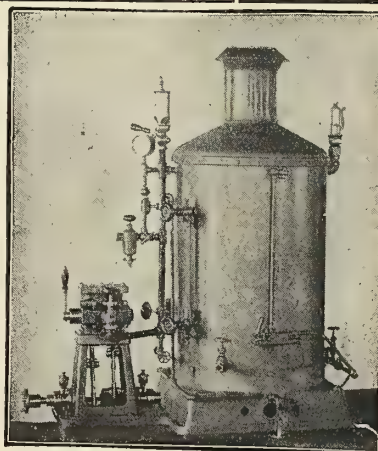
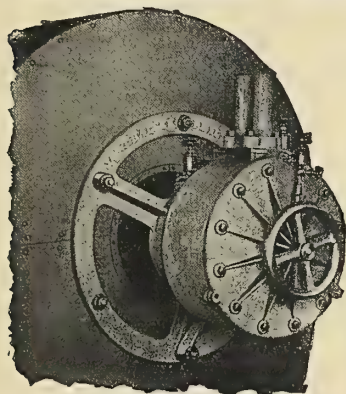
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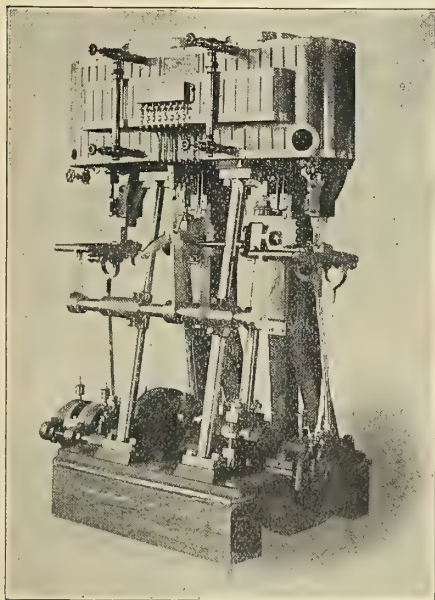
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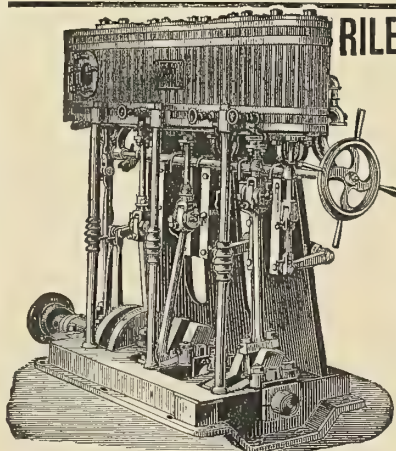
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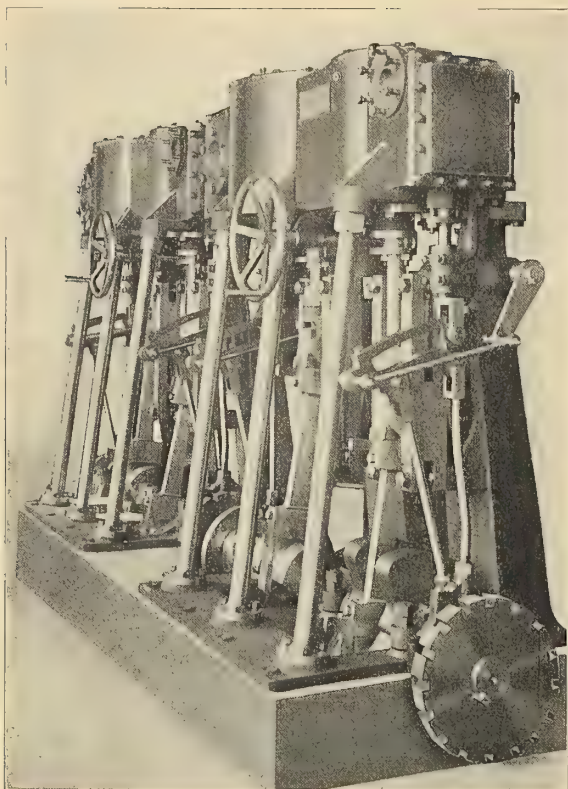
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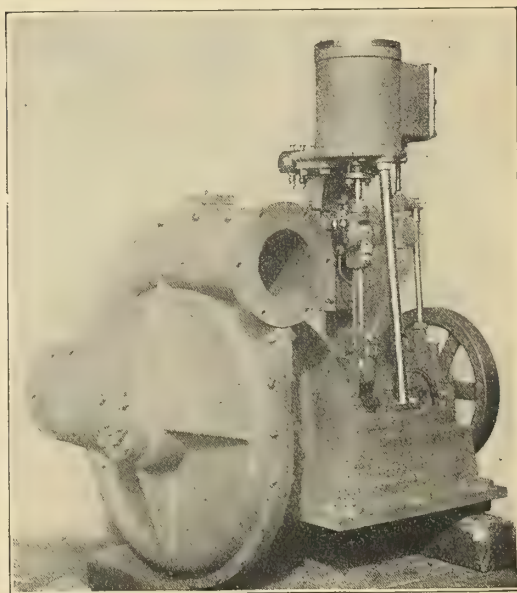
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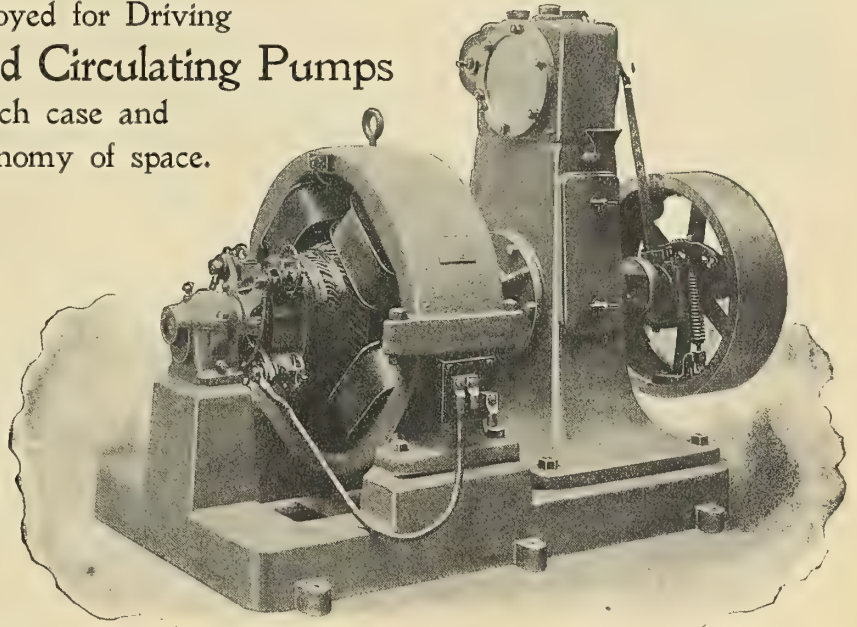
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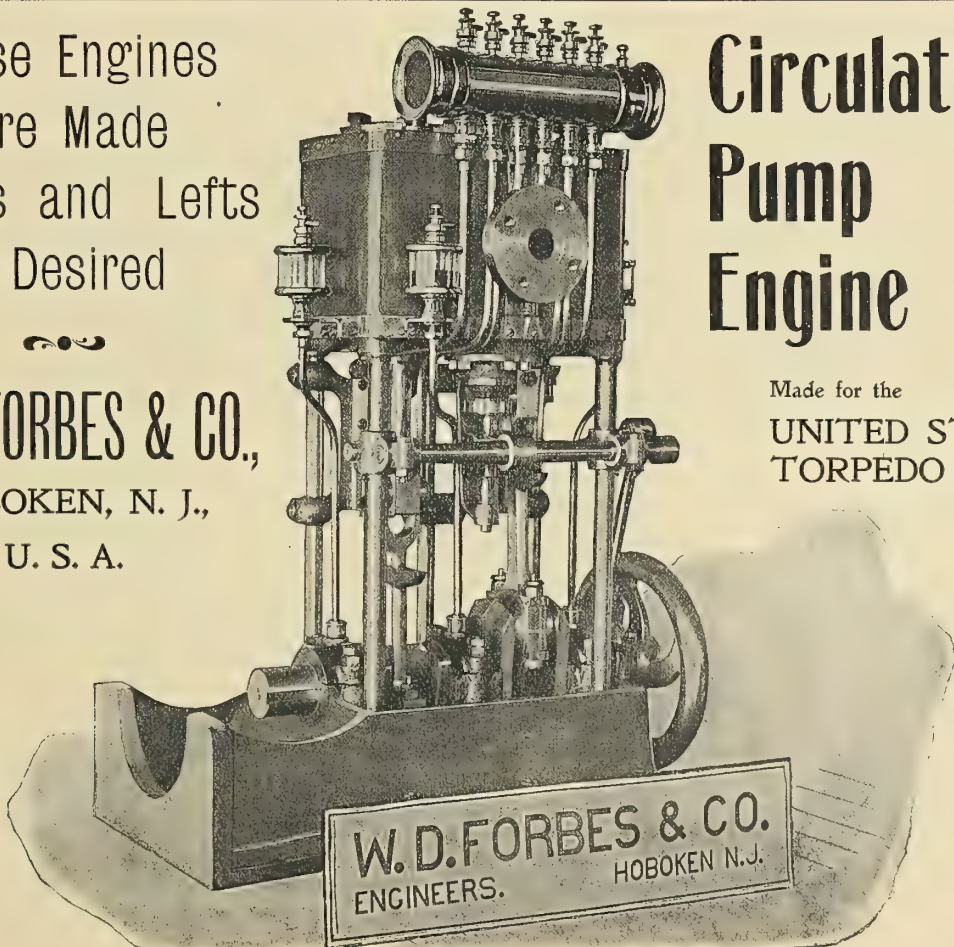
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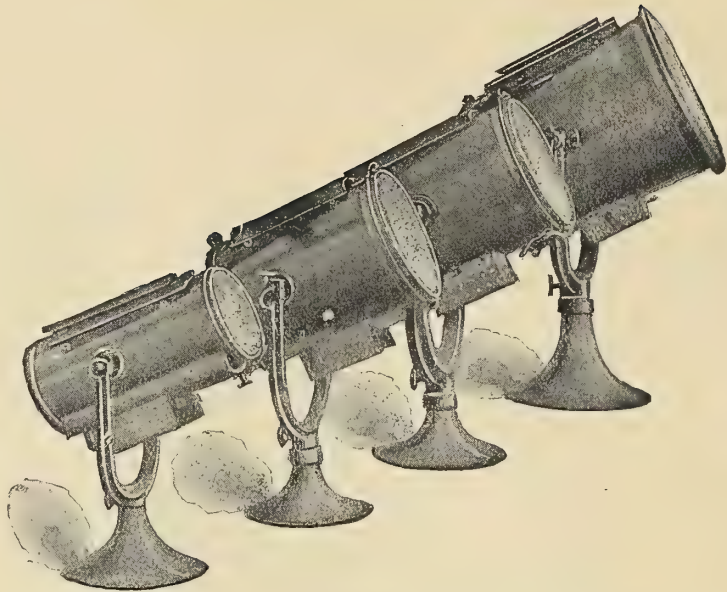
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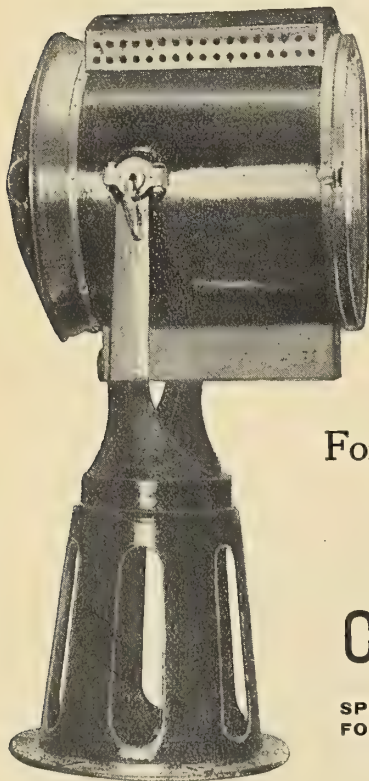
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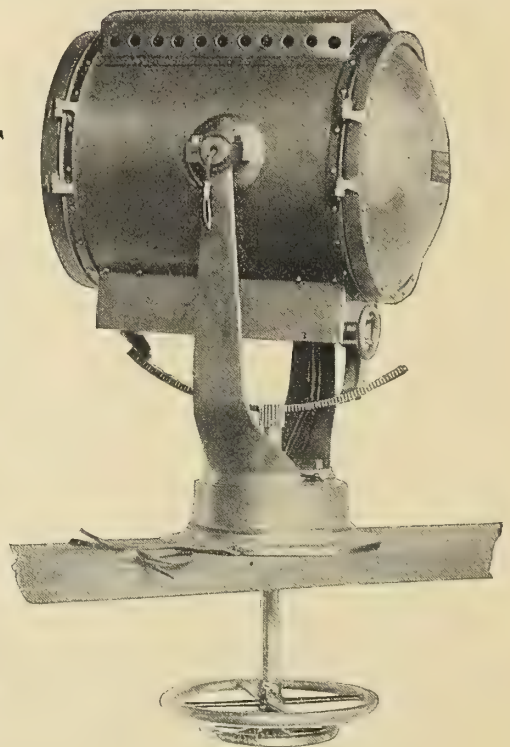
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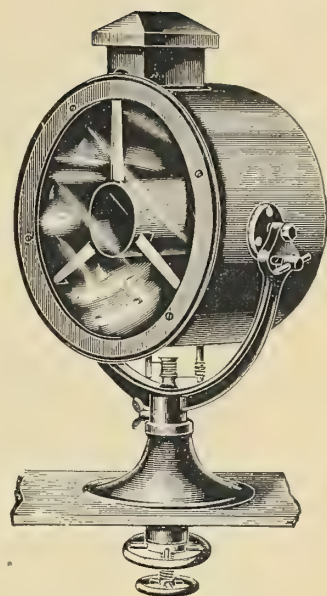
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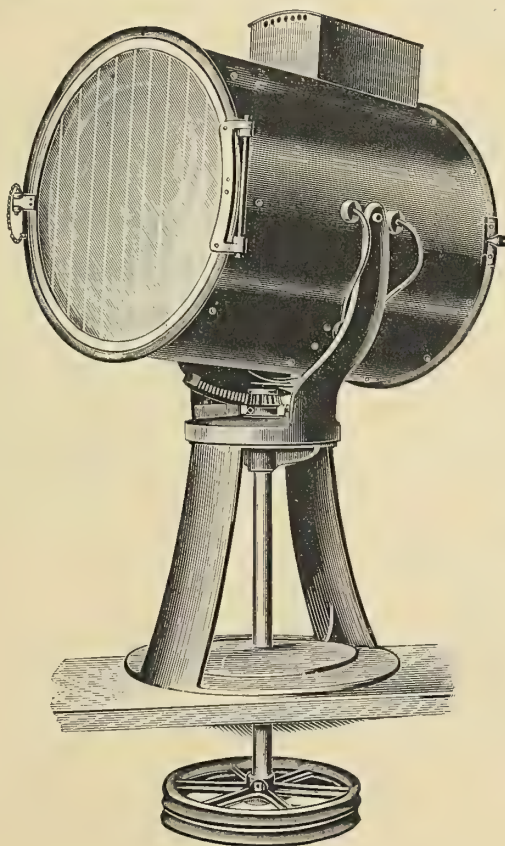
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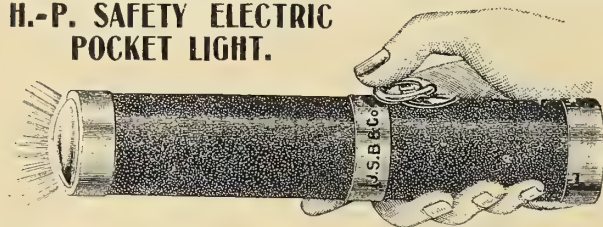
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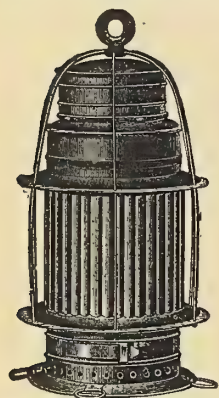
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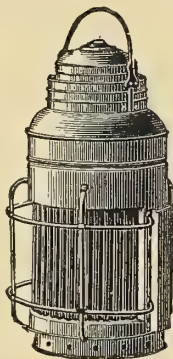
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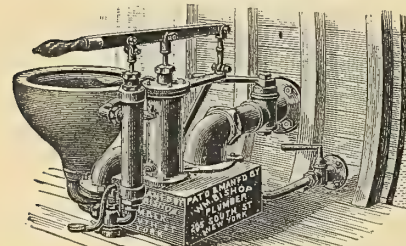
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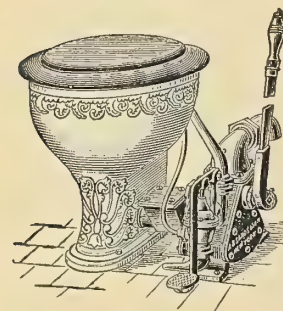


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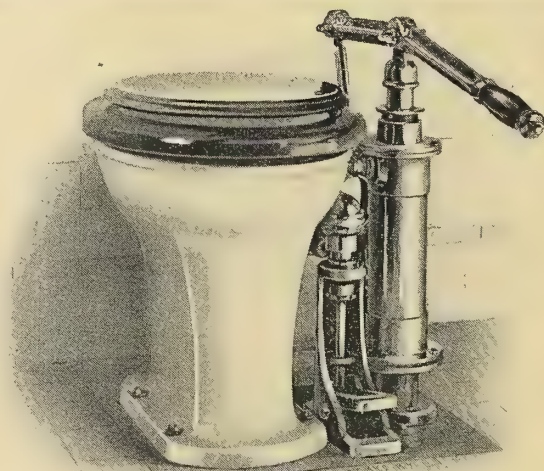
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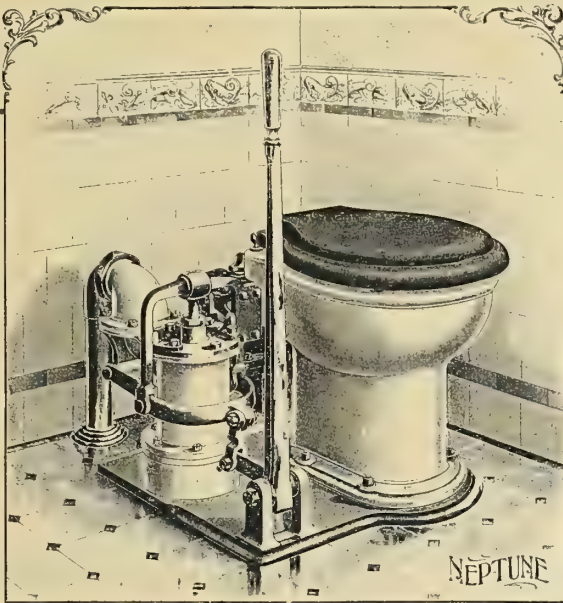
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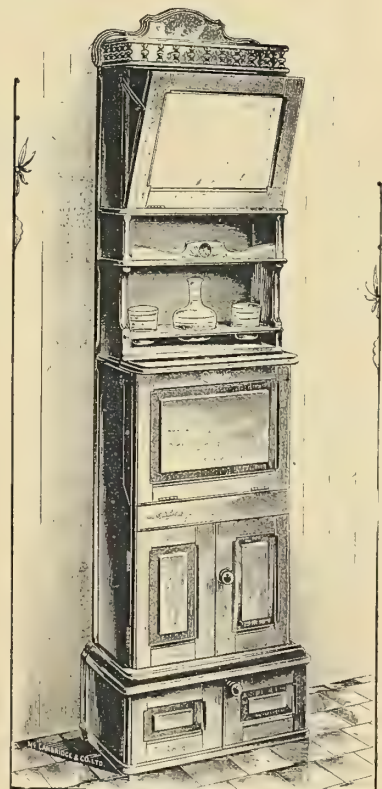
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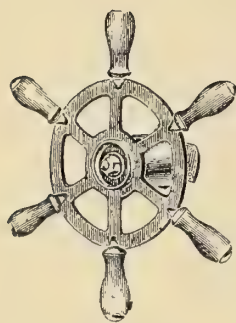
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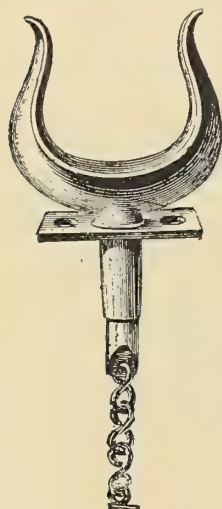
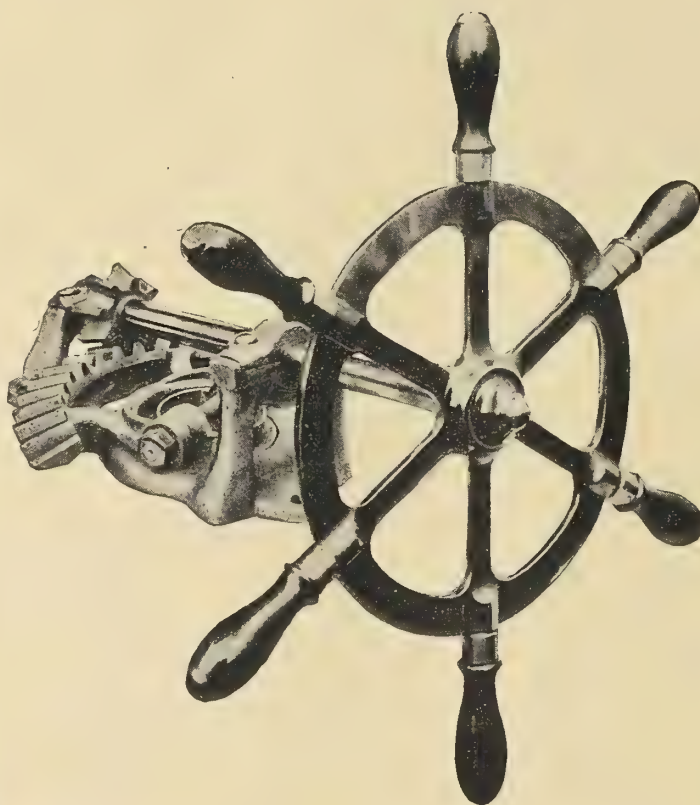
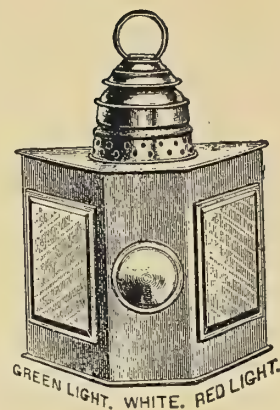
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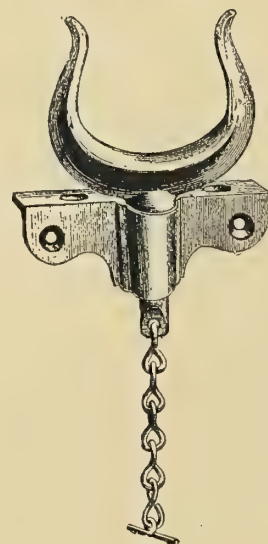
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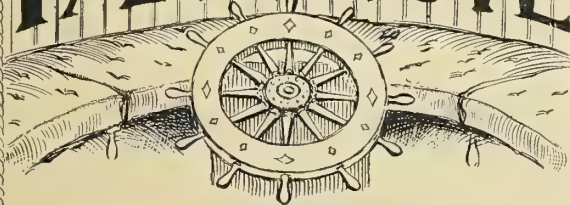


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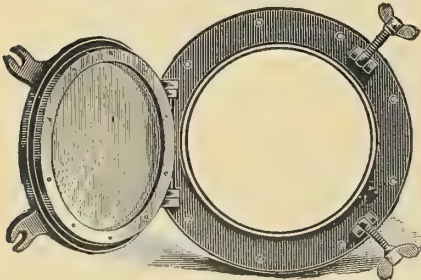
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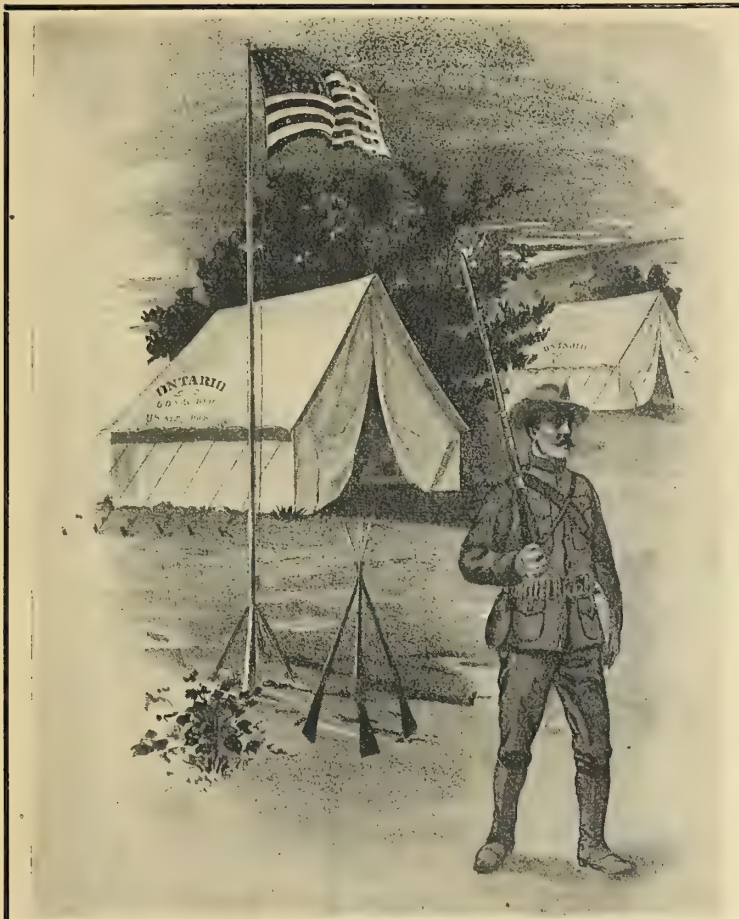
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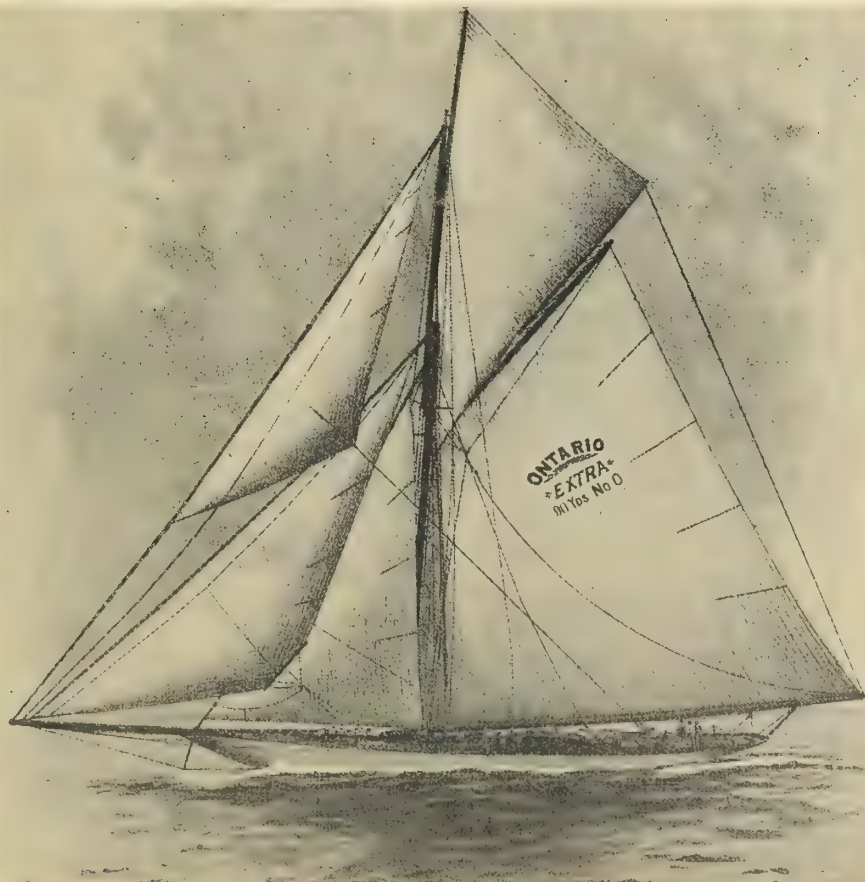
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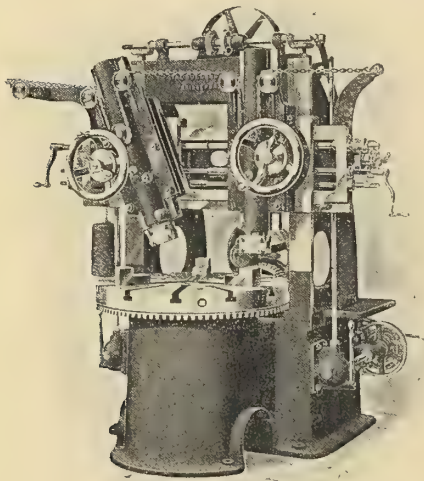
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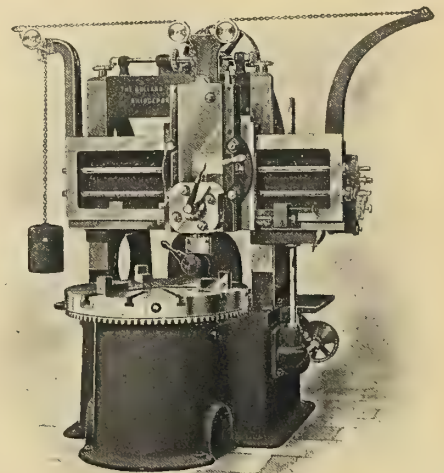


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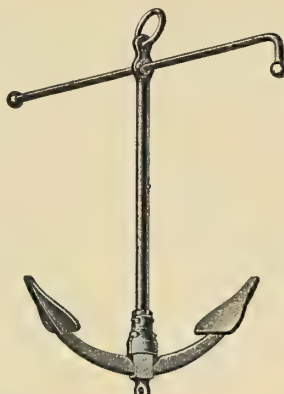


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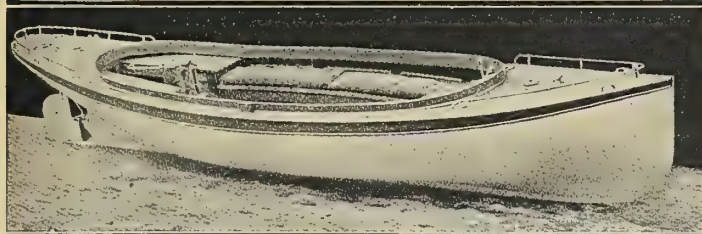
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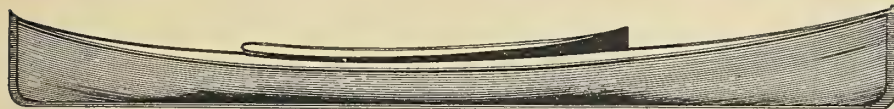


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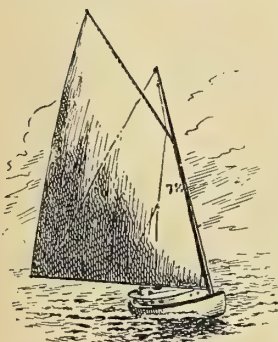
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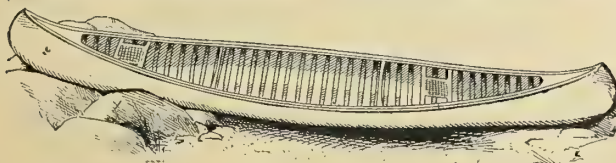
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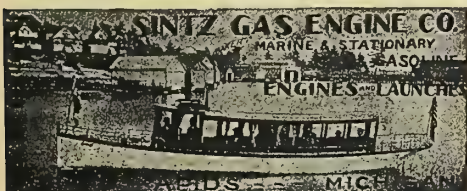
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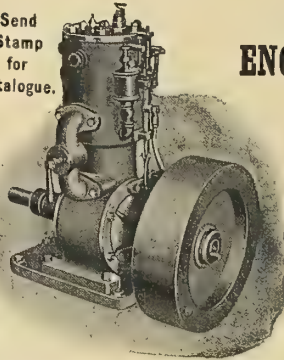
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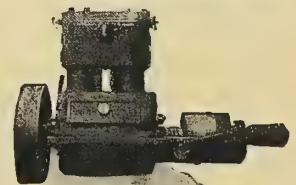
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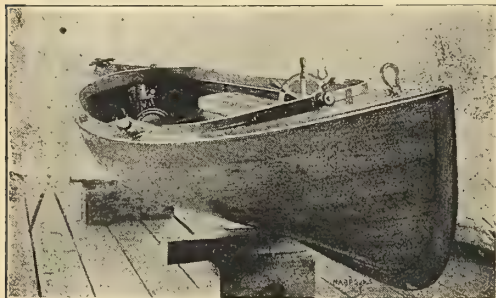
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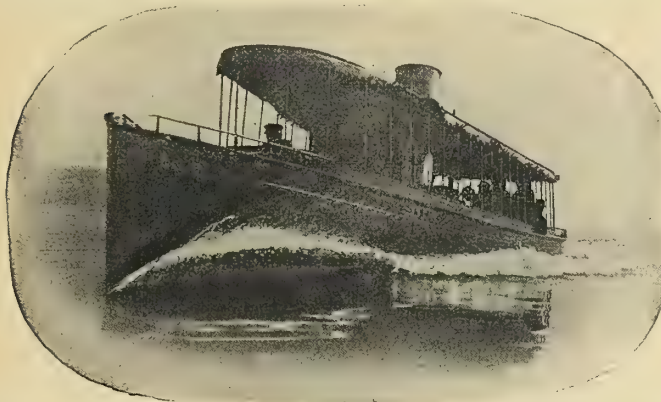
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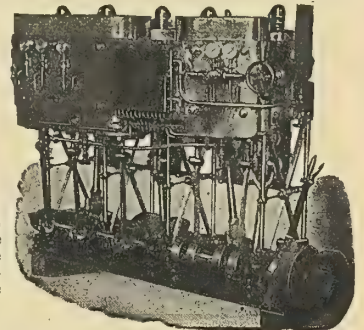
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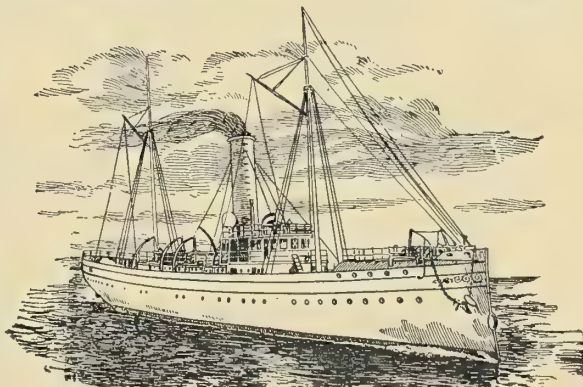
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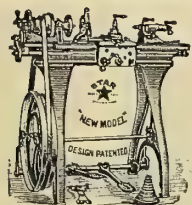
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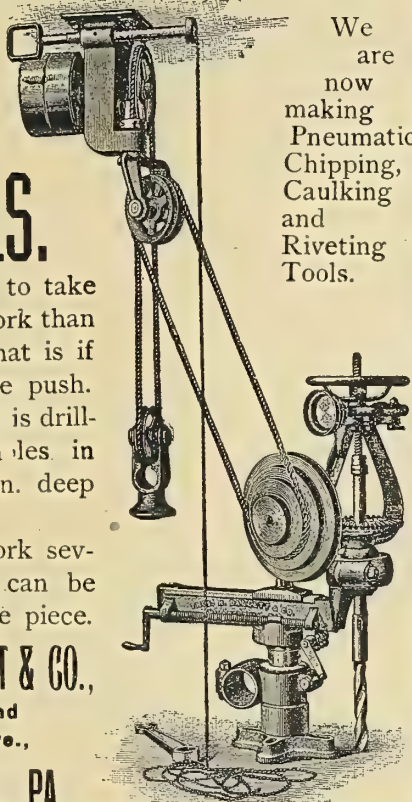
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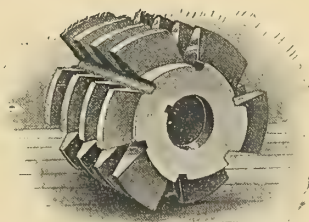
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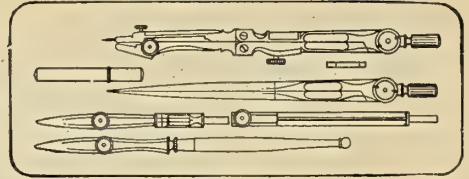
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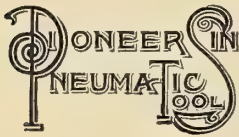


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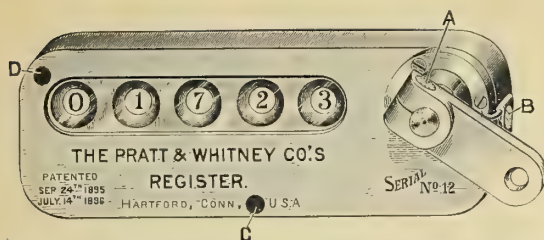
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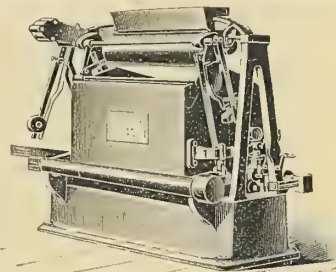
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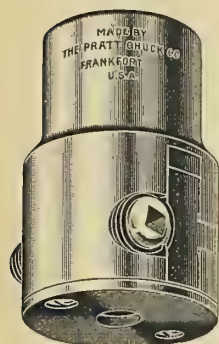
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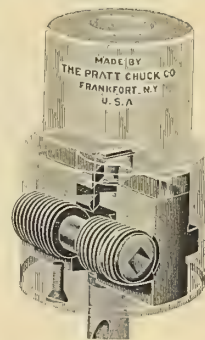


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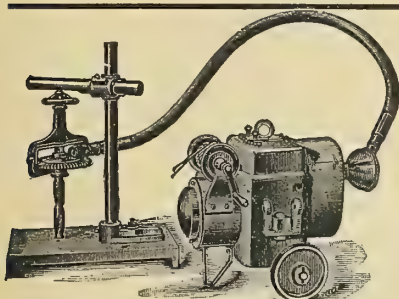


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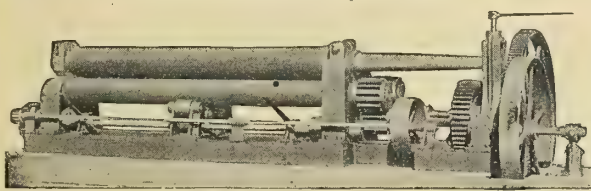
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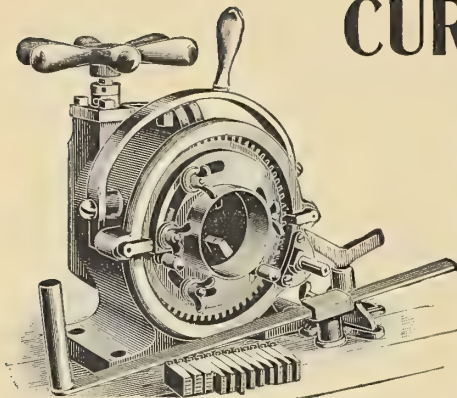
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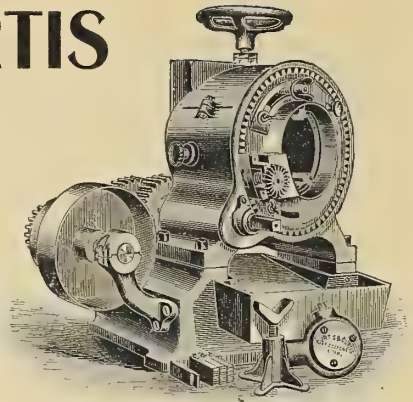


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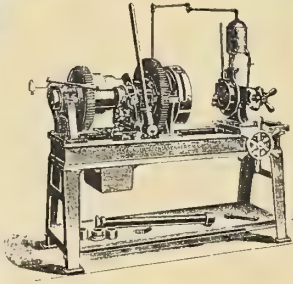
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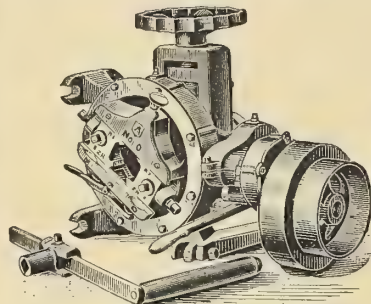
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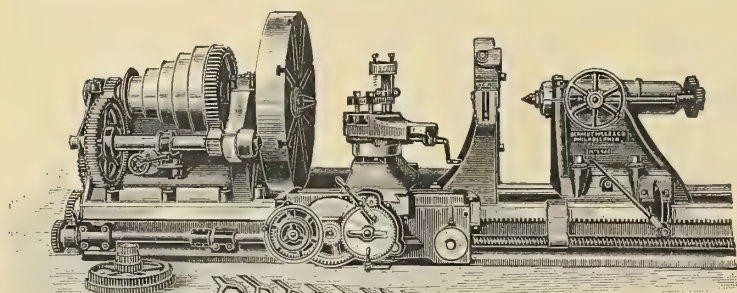
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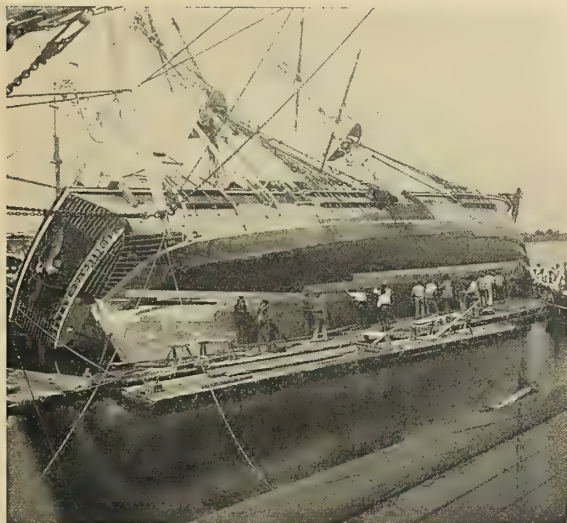
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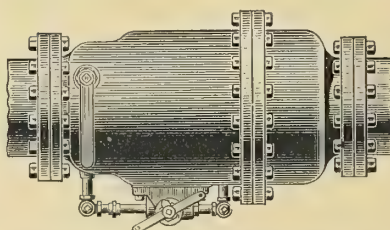
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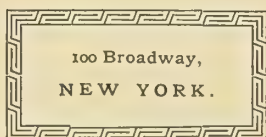
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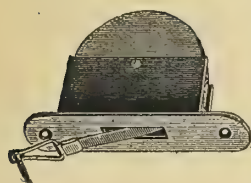
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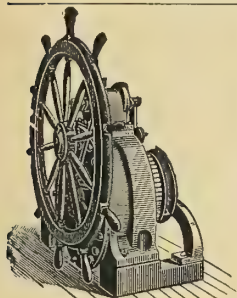
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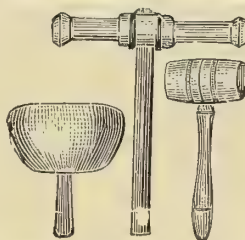
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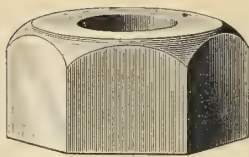
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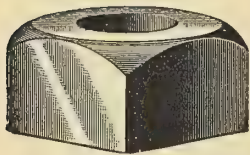
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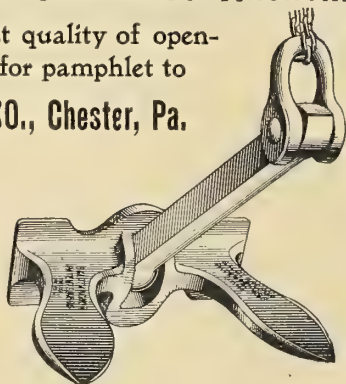
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## INDEX TO ADVERTISERS.

|                                                  |                    |
|--------------------------------------------------|--------------------|
| <b>ANCHORS.</b>                                  |                    |
| Baldt Anchor Co.....                             | 102                |
| Wilcox, Crittenden & Co.....                     | 89                 |
| <b>ANCHOR CABLES.</b>                            |                    |
| Carr, J. B., Co., The.....                       | 82                 |
| <b>BEARINGS.</b>                                 |                    |
| Ball Bearing Co., The.....                       | 104                |
| Graphite Lubricating Co.....                     | 69                 |
| Pittsburg White Metal Co.....                    | 67                 |
| Ryan, J. J., & Co.....                           | inside front cover |
| <b>BLOCKS.</b>                                   |                    |
| Boston and Lockport Block Co.....                | 102                |
| <b>BOILERS.</b>                                  |                    |
| Almy Water Tube Boiler Co.....                   | 74                 |
| Boyer Patent Sectional Water Tube Boiler Co..... | 75                 |
| Clark, Edw. S.....                               | 74                 |
| De Puy, Captain M.....                           | 75                 |
| Detroit Screw Works.....                         | 75                 |
| Kingsford Foundry & Machine Works.....           | 76                 |
| Mississippi Safety Boiler Co.....                | 74                 |
| Stirling Co., The.....                           | outside back cover |
| Thorpe, Platt & Co.....                          | 76                 |
| Tonkin, J. J.....                                | 76                 |
| <b>BOILER COMPOUND.</b>                          |                    |
| Sumac Co., The.....                              | 71                 |
| <b>BOILER TUBES.</b>                             |                    |
| Shelby Steel Tube Co.....                        | 74                 |
| <b>BOLTS AND NUTS.</b>                           |                    |
| Port Chester Bolt and Nut Co.....                | 102                |
| <b>BRASS AND COPPER.</b>                         |                    |
| Benedict & Burnham Mfg. Co.....                  | 99                 |
| Hungerford, U. T., Brass and Copper Co.....      | 99                 |
| Merchant & Co.....                               | 99                 |
| Randolph & Clowes.....                           | 99                 |
| <b>CAPS AND UNIFORMS.</b>                        |                    |
| The Warnock Uniform Co.....                      | 56                 |
| <b>CAPSTANS AND WINDLASSES.</b>                  |                    |
| Hyde Windlass Co.....                            | outside back cover |
| <b>CAULKING TOOLS.</b>                           |                    |
| New York Mallet & Handle Co.....                 | 101                |
| <b>CHANDLERY STORES AND SUPPLIES.</b>            |                    |
| Calkin, H. C., Jr.....                           | 56                 |
| Carpenter, Geo. B., & Co.....                    | 86                 |
| Edson Mfg. Co.....                               | 86                 |
| Durkee, Chas. D., & Co.....                      | 84                 |
| Marine Manufacturing & Supply Co.....            | 86                 |
| Reilly, Jas., Repair and Supply Co.....          | 86                 |
| <b>CONDENSERS.</b>                               |                    |
| Taunton Locomotive Mfg. Co.....                  | 67                 |
| Whitlock Coil Pipe Co.....                       | 67                 |
| <b>CORRESPONDENCE SCHOOLS.</b>                   |                    |
| International Correspondence Schools.....        | 67                 |
| <b>COTTON DUCK.</b>                              |                    |
| J. Spencer Turner Co.....                        | 87                 |
| <b>COVERINGS—STEAM.</b>                          |                    |
| Keasbey, Robert A.....                           | 73                 |
| New Jersey Asbestos Co.....                      | 73                 |
| New York Asbestos Mfg. Co.....                   | 73                 |
| <b>COVERING FOR CUSHIONS.</b>                    |                    |
| Pantasote Co., The.....                          | 85                 |
| <b>CUSHIONS AND MATTRESSES.</b>                  |                    |
| Fogg, M. W.....                                  | 85                 |
| Mechanical Fabric Co.....                        | 85                 |
| <b>DRAFTSMEN'S SUPPLIES.</b>                     |                    |
| Alteneder, Theo., & Sons.....                    | 95                 |
| Emerson, F. W., Mfg. Co.....                     | 96                 |
| Keuffel & Esser Co.....                          | 96                 |
| <b>DREDGING.</b>                                 |                    |
| Morris & Cumings Dredging Co.....                | 82                 |
| New York Dredging Co.....                        | 82                 |
| <b>ELECTRICAL APPARATUS.</b>                     |                    |
| C & C Electric Co.....                           | 59                 |
| High Tension Electric Storage Co.....            | 59                 |
| Sturtevant, B. F., Co.....                       | 63                 |
| Westinghouse Electric & Mfg. Co.....             | 55                 |
| <b>ELECTRICAL INSTRUMENTS.</b>                   |                    |
| Weston Electrical Instrument Co.....             | 54                 |
| <b>ELECTRIC POCKET LIGHT.</b>                    |                    |
| Barron, J. S., & Co.....                         | 82                 |
| <b>ENGINEERS AND MACHINISTS.</b>                 |                    |
| Brown & Miller.....                              | 91                 |
| Columbia Engineering Works.....                  | 91                 |
| Krajewski-Pesant Co.....                         | 56                 |
| Morse Iron Works Co.....                         | 91                 |
| <b>ENGINES—GASOLINE.</b>                         |                    |
| American Motor Co.....                           | 89                 |
| Denison Electrical Engineering Co.....           | 90                 |
| Riotte, C. C., Co.....                           | 90                 |
| <b>ENGINES—STEAM.</b>                            |                    |
| Cruickshank Engine Co.....                       | 76                 |
| Forbes, W. D., & Co.....                         | 79                 |
| Halsey, James T.....                             | 77                 |
| Knickerbocker Engine Co.....                     | 77                 |
| Morris Machine Works.....                        | 78                 |
| New Britain Machine Co.....                      | 79                 |
| Paine, James H., & Son.....                      | 77                 |
| Riley & Cowley.....                              | 77                 |
| Shortt Engine Co.....                            | 77                 |
| Twiss, Nelson W.....                             | 77                 |
| Westinghouse Machine Co.....                     | 55                 |
| Westinghouse, Church, Kerr & Co.....             | 55                 |

|                                         |                    |
|-----------------------------------------|--------------------|
| <b>FEED WATER PURIFIER.</b>             |                    |
| Learmonth, Robert.....                  | 68                 |
| <b>FIRE EXTINGUISHERS.</b>              |                    |
| H. R. Bennett.....                      | 73                 |
| <b>FLAGS AND SIGNALS.</b>               |                    |
| W. H. Horstmann Co.....                 | 85                 |
| <b>FLANGES.</b>                         |                    |
| Latrobe Steel Co.....                   | 76                 |
| <b>FORGES.</b>                          |                    |
| Crumlish Forge Co.....                  | 104                |
| <b>FORGINGS AND CASTINGS.</b>           |                    |
| Bethlehem Iron Co.....                  | 100                |
| Frankford Steel Co.....                 | 100                |
| Whitestone Forge & Construction Co..... | 100                |
| <b>GALVANIZING.</b>                     |                    |
| U. S. Electro-Galvanizing Co.....       | 56                 |
| <b>GRAPHITE.</b>                        |                    |
| Dixon, Jos., Crucible Co.....           | 53                 |
| <b>INDICATORS.</b>                      |                    |
| Robertson, James L., & Son.....         | 55                 |
| Thompson, Richard & Co.....             | 72                 |
| <b>INJECTORS.</b>                       |                    |
| Penberthy Injector Co.....              | 66                 |
| Eynon-Evans Manufacturing Co.....       | 68                 |
| <b>KEEL BLOCKS.</b>                     |                    |
| Higley Keel Block Co.....               | 90                 |
| <b>LAMPS, SIGNALS AND FIXTURES.</b>     |                    |
| Lovell, F. H., & Co.....                | 82                 |
| Porter's Sons Co., Wm.....              | 82                 |
| Russell & Watson.....                   | 82                 |
| <b>LIFE PRESERVERS.</b>                 |                    |
| Armstrong Cork Co.....                  | outside back cover |
| <b>LUBRICATORS.</b>                     |                    |
| McClure Oil Pump Co.....                | 69                 |
| Phillips, W. P., & Co.....              | 69                 |
| <b>LUMBER.</b>                          |                    |
| Kells, Thomas, & Sons.....              | 100                |
| <b>MARINE GLASSES.</b>                  |                    |
| Bausch & Lomb Optical Co.....           | 85                 |
| <b>MARINE RAILWAYS.</b>                 |                    |
| Crane's Sons, Theodore A.....           | 92                 |
| Tobo's Dry Dock Co.....                 | 92                 |
| <b>MARINE RAILWAY BUILDERS.</b>         |                    |
| Crandall, H. I., & Son.....             | 93                 |
| <b>MEGAPHONES.</b>                      |                    |
| Merriman Bros.....                      | 102                |
| <b>METAL POLISH.</b>                    |                    |
| Ayrolite Co., The.....                  | 68                 |
| Bertram's Oil Polish Co.....            | outside back cover |
| Callery, W. W., & Co.....               | 68                 |
| Marine Vapor Engine Co.....             | 68                 |
| Rath Mfg. Co.....                       | 68                 |
| <b>MISCELLANEOUS.</b>                   |                    |
| Blickensderfer Mfg. Co.....             | 72                 |
| Great Lakes Register.....               | 101                |
| <b>PACKING.</b>                         |                    |
| Boston Belting Co.....                  | 65                 |
| Brandt, Randolph.....                   | 65                 |
| Chesteron, A. W., & Co.....             | inside back cover  |
| Duval Metallic Packing Co.....          | 65                 |
| Garlock Packing Co.....                 | 65                 |
| Katzenstein, L., & Co.....              | 65                 |
| Peerless Rubber Mfg. Co.....            | 57                 |
| St. John Cylinder Packing Co.....       | outside back cover |
| U. S. Metallic Packing Co.....          | 64                 |
| Watts' Sons, J. M.....                  | 67                 |
| <b>PAINTS AND PRESERVATIVES.</b>        |                    |
| American Pegamoid Co.....               | 101                |
| New Jersey Zinc Co.....                 | 54                 |
| <b>PIPE UNIONS.</b>                     |                    |
| Dart, E. M., Manufacturing Co.....      | 69                 |
| <b>PNEUMATIC TOOLS.</b>                 |                    |
| American Pneumatic Tool Co.....         | 96                 |
| National Pneumatic Tool Co.....         | 96                 |
| Q. & C. Co., The.....                   | 52                 |
| <b>PROFESSIONAL CARDS.</b>              |                    |
| Gardner & Cox.....                      | 67                 |
| Hillman, Gustav.....                    | 67                 |
| Roelker, H. B.....                      | 67                 |
| <b>PROPELLER WHEELS.</b>                |                    |
| Reeves, Paul S., & Son.....             | 104                |
| Sheriffs Mfg. Co.....                   | 104                |
| <b>PUMPS.</b>                           |                    |
| Deane Steam Pump Co.....                | inside front cover |
| Snider-Hughes Co.....                   | 72                 |
| Snow Steam Pump Works.....              | 72                 |
| Union Steam Pump Co.....                | 58                 |
| Worthington, Henry R.....               | 72                 |
| <b>RANGES-SHIP AND GALLEY.</b>          |                    |
| Duparquet, Huot & Moneuse Co.....       | 103                |
| Stamford Foundry Co.....                | 103                |
| <b>ROPE AND CORDAGE.</b>                |                    |
| American Manufacturing Co.....          | inside front cover |
| <b>SAIL MAKERS.</b>                     |                    |
| Hemmenway, S., & Son.....               | 86                 |
| <b>SASH BALANCES.</b>                   |                    |
| Pullman Sash Balance Co.....            | 101                |
| <b>SEAM COMPOSITION.</b>                |                    |
| Cole & Kuhls.....                       | 71                 |
| <b>SEARCH LIGHTS.</b>                   |                    |
| Benton, Thos. P. & Son.....             | 81                 |
| Bogue, Chas. J.....                     | 80                 |
| Carlisle & Finch Co.....                | 80                 |
| Colt, J. B., Co.....                    | 81                 |
| <b>SHIP BUILDERS.</b>                   |                    |
| Atlantic Works.....                     | 94                 |

(Continued on next page.)

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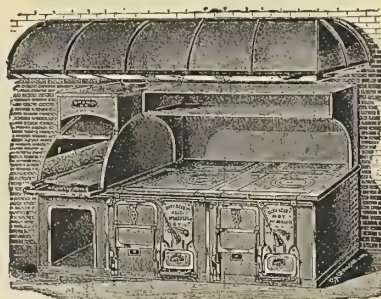
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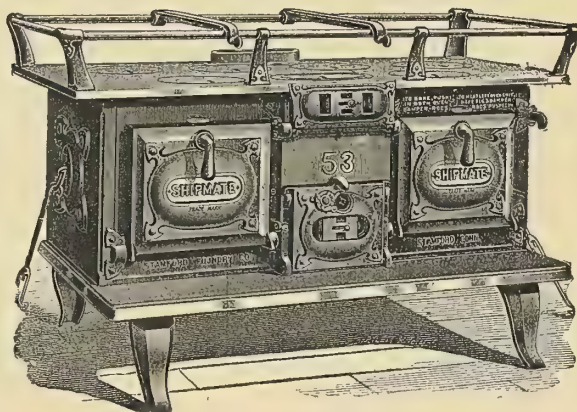
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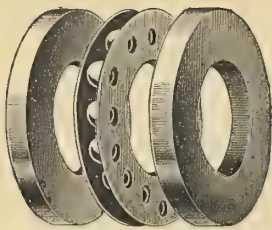


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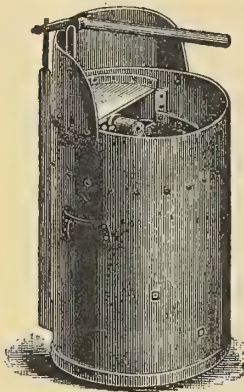
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## INDEX TO ADVERTISERS—(Concluded.)

|                                                   |                    |
|---------------------------------------------------|--------------------|
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| Spedden Ship Building Co.                         | 93                 |
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| <b>TOWING AND TRANSPORTATION.</b>                 |                    |
| Luckenbach, Lewis                                 | 104                |
| <b>TUBE EXPANDERS.</b>                            |                    |
| Henderer's Sons, A. L.                            | 76                 |
| <b>VALVE RESEATING MACHINES.</b>                  |                    |
| Leavitt Machine Co.                               | 68                 |
| <b>VERMIN DESTROYERS.</b>                         |                    |
| Allison Chemical Co.                              | 101                |
| <b>WATCHES.</b>                                   |                    |
| Becken, A. C.                                     | 59                 |
| <b>WATER CLOSETS.</b>                             |                    |
| Bishop's, Wm., Sons                               | 82                 |
| McCambridge & Co., L't'd.                         | 83                 |
| Mott, J. L., Iron Works                           | 82                 |
| Sands, Alfred B., & Son.                          | 82                 |
| <b>WORM GEARING.</b>                              |                    |
| Morse, Williams & Co.                             | 58                 |
| <b>YACHT AND BOAT BUILDERS.</b>                   |                    |
| Crosby, H. Manley                                 | 89                 |
| Daimler Manufacturing Co.                         | 89                 |
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| Marine Vapor Engine Co.                           | 90                 |
| Mather, C. B., & Co.                              | 89                 |
| Mianus Electric Co.                               | 90                 |
| Mosher, Chas. D.                                  | 91                 |
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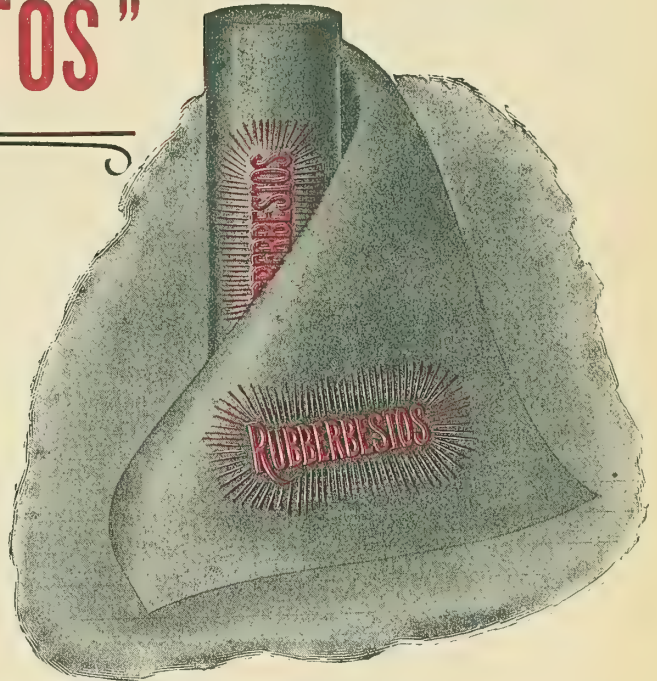
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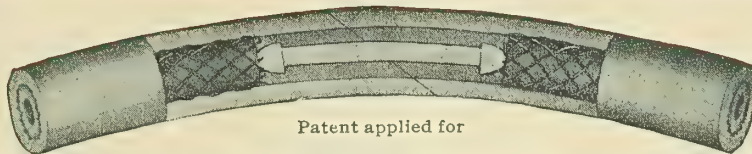
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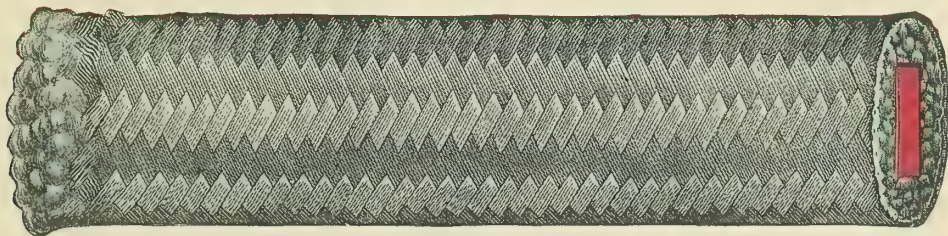


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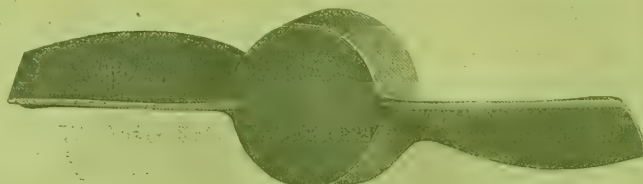
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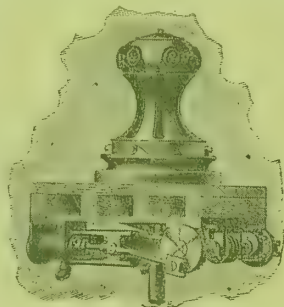
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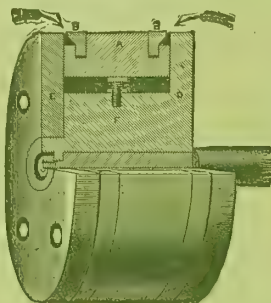


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